United States Circuit Court of Appeals

FOR THE SECOND CIRCUIT.

INTERCHEMICAL CORPORATION,

Plaintiff-Appellant,

v.

SINCLAIR & CARROLL CO., INC.,

Defendant-Appellee.

On Appeal from the United States District Court
for the Southern District of New York.

TRANSCRIPT OF RECORD.

ROBERT W. BYERLY and
RALPH M. WATSON,
New York, N. Y.,
Counsel for Plaintiff-Appellant.

HOGUET, NEARY & CAMPBELL,
WALTER H. FREE and
JOHN F. NEARY, JR.,
New York, N. Y.,
Counsel for Defendant-Appellee.

INDEX.*

	PAGE
Prefatory Statement	1
Complaint	2
Answer	4
Amendment to Answer	9
Plaintiff's Bill of Particulars	11
Defendant's Bill of Particulars	13
PLAINTIFF'S WITNESSES.	
Charles R. Bragdon:	
Direct	25
Cross	55
Re-direct	63
Re-cross	63
Re-direct	64
Frank W. Cray:	
Direct	65
Cross	88
Re-direct	99
Re-cross	101
William A. Magie (deposition):	
Direct	103
Cross	103
John Krawetz (deposition):	
Direct	105
Re-direct	106
Re-cross	107

* A complete Index printed in each volume.

PAGE

Albert E. Gessler:
Direct 108
Cross 119
Re-direct 130
Re-cross 140

Calvin Detrick:
Direct 146

Martin J. Hurley:
Direct 147
Cross 157
Re-direct 162
Re-cross 163

Calvin Detrick (recalled):
Direct 163
Cross 167

Gilbert W. Stratton (deposition):
Direct 170
Cross 172
Re-direct 175
Re-cross 175

James M. Alden (stipulated):
Direct 176

Paul O. Blackmore:
Direct 177
Cross 183

Ralph A. Hayward (deposition):
Direct 185
Cross 201
Re-direct 206
Re-cross 207

Francis J. Jeuck:
Direct 209
Cross 225

Herbert F. Smith:
Direct 229
Cross 234

PAGE

Peter Dennerlein (deposition):
Direct 235
Cross 238
Re-direct 238

REBUTTAL PROOFS.

Edward R. Busby (deposition):
Direct 583
Cross 602

Leonard R. Hecker (deposition):
Direct 609
Cross 614
Re-direct 621
Re-cross 621

Edmond P. Joy (deposition):
Direct 622
Cross 629

Peter Dennerlein (deposition):
Direct 634

Charles R. Bragdon:
Direct 640
Cross 671
Re-direct 682
Re-cross 688

Sidney Satenstein:
Direct 688
Cross 692
Re-direct 695
Re-cross 696

Milton W. Durham:
Direct 696

Albert E. Gessler:
Direct 701
Cross 719

DEFENDANT'S WITNESSES.

	PAGE
Clinton Taylor:	
Direct	247
Cross	326
Re-direct	382
Re-cross	388
Re-direct	393
Re-cross	394
William A. Magie (deposition):	
Direct	396
Cross	399
Re-direct	400
John Krawetz (deposition):	
Direct	401
Cross	405
Re-direct	408
Re-cross	409
Edward Beres (deposition):	
Direct	410
Cross	418
Re-direct	421
Re-cross	422
Charles J. Theuer (deposition):	
Direct	422
Cross	432
Re-direct	435
Re-cross	440
Re-direct	440
Lewis E. Nichols (deposition):	
Direct	441
Cross	460
Re-direct	465

PAGE

Clayton H. Benjamin (deposition):
Direct 465
Cross 475
Re-direct 476

Frank Pellinger (deposition):
Direct 477
Cross 491
Re-direct 498

Peter Dennerlein (deposition):
Direct 501
Cross 501
Re-direct 509
Re-cross 509

Roy Carroll:
Direct 510
Cross 531
Re-direct 542

Raymond A. Kerley:
Direct 545
Cross 558
Re-direct 569
Re-cross 571

Clinton Taylor (recalled):
Cross 572

PLAINTIFF'S EXHIBITS.

	Offered at Page	*Printed at Page*
1—Stipulation	23	730
2—Copy of patent in suit	23	733
3—Assignment from Zinsser & Company to the plaintiff, dated April 2, 1935	24	734
4—Defendant's answers to plaintiff's interrogatories 1 to 5, and 8 to 10	24	736

	Offered at Page	Printed at Page
5—Paper containing graphs testified to by the witness Bragdon	54	741
6—Sample of ink with an alcohol solvent used by the witness Bragdon	36	....
7—Film of ink on paper, the ink being that of Exhibit 6	36	....
8—Second ink sample used by the witness Bragdon, being ink whose solvent is butyl acetate, having a vapor pressure of 1½ centimeters at room temperature	36	....
9—Film made with ink (Exhibit 8)	36	....
10—Butyl carbitol ink	38	....
11—Paper	38	....
12—Sheet which the witness Bragdon placed on top of Exhibits 7 and 9	39	....
13—Graph testified to by the witness Bradgon	54	*
14—Chart testified to by the witness Bragdon	71	743
15—Print testified to by the witness Cray as being the first heat-drying ink he saw	76	....
16 id.—Memorandum in the handwriting of Dr. Dufford	78	....
17—Sheet of November 12, 1932 belonging to Mr. Finne	80	....
18—Diagram testified to by the witness Hurley	150	*
19—Sales invoices testified to by the witness Blackmore	179	....
20—Formulæ cards for the nitrocellulose lacquer having laboratory code number 895-1, and the manufacturing code number W4608	180	*

* Copy in separately filed book.

	Offered at Page	Printed at Page
21—Letter dated December 21, 1932, signed by Calvin Detrick addressed to Mr. Hayward	188	744
22—Letter to Mr. Hayward from Mr. Detrick of Manufacturers Printing Ink Corporation, dated June 5, 1933	188	745
23—Letter from Mr. Detrick to witness Hayward dated February 20, 1933	190	746
24—Letter from Mr. Detrick to witness Hayward dated March 14, 1933	191	748
25—Mr. Detrick's letter to witness Hayward dated March 31, 1933	191	750
26—Copy of telegram of May 4th and reply thereto testified to by the witness Hayward	192	751
27—Order produced by the witness Hayward dated May 26, 1933, addressed to the Manufacturers Printing Ink Corporation	194	753
28—Letter to witness Hayward from Mr. Detrick dated June 2, 1933	194	754
29—Series of invoices from the International Printing Ink Corporation running from December 19, 1933 to January 29, 1936	196	...
30—Group of invoices running from August 12, 1936, through November 18, 1942, showing purchases made from the International Printing Ink Company	199	...
31—Copies of formulæ testified to by the witness Jeuck	211	...
32—Copies of formulæ MX-3858 and MX-3859	230	...
33—Patent No. 1,460,391 to Sidney Satenstein	344	755

* Copy in separately filed book.

	Offered at Page	Printed at Page
34—Copy of pamphlet entitled "Report of Committee on Standardization of Petroleum Specifications 'Bulletin No. 5'"	354	*
35—United States Government specifications testified to by the witness Taylor	355	*
36—Catalogue of the Hilton Davis Company (cover and pp. 53, 54)	369	*
38—Cumar specification chart	542	*
39—Sheet from Life Magazine testified to by witness Busby as having been printed on one side	591	
40—Sheet which was printed with heat-set inks on Press 89	593	
41—Sheet testified to by witness Busby as having been printed on Press 100	594	
42—Sheet which was printed on a 2-color Life 64-page press	595	
43—Single-color heat set signature printed on a 64-page Life press	597	
44—Single-color signature for Time Magazine printed on a 64-page Time press	597	
45—Chart testified to by witness Bragdon as showing the same curve as shown in Taylor's Exhibit B-1 in the upper line drawn in red	645	*
46—Graph indicating the witness Bragdon's determination of the boiling point of the I. P. I. solvent	647	*
47—Graph drawn by the witness Bragdon to show the comparison between the curves	648	*
48—Photostat of pages from the book entitled "Petroleum"	650	*

* Copy in separately filed book.

	Offered at Page	Printed at Page
49 id.—Boiling range of kerosene about which the witness Bragdon testified	655	756
50 id.—Proof of the vapor pressure of the kerosene about which the witness Bragdon testified	655	*
51 id.—Chart showing the boiling range of the kerosene at about 250 made and testified to by the witness Bragdon and the kerosene above 250 given by Mr. Taylor on Exhibit B-1	655	*
52—Chart showing the determination of the boiling range of defendant's kerosene made and testified to by the witness Bragdon	657	756
53—Comparison of formulæ produced and testified to by the witness Bragdon	658	757
54—Barrett Company's catalog (index, title page and page 12)	659	*
55—Chart showing the witness Bragdon's determination of defendant's 502-C ink oil, the I. P. I. petroleum solvent mentioned in Defendant's Exhibit B-1	659	*
56—Chart showing that the vapor pressure of oil of cassia at 20 degrees is about .2 of a millimeter	661	*
57—Chart which shows that terpineol is very much more volatile than rosin-oil	668	759
58—Ink prepared in accordance with the formula of the Doughty patent, containing four parts of terpineol, 1 part of rosin and 10 parts of bronze powder	668	....

* Copy in separately filed book.

	Offered at Page	Printed at Page
59—Statement of the ingredients of the ink given in the specific example of the Jirousek patent, showing the percentage of the different ingredients	670	760
60—Ink vehicle of the McElroy patent produced by the witness Bragdon	671	....
61—Schematic drawing showing the vapor pressure measuring apparatus in the plaintiff's laboratories	687	*
62—Notebook which the witness Gessler kept of his work when he was the chief chemist of the Zinsser Company (3 pages relating to Experiment 842B; 4 pages relating to Experiment 842C; and 2 pages relating to Experiment 842E)	720	*
63—Letter dated February 17, 1932 from the witness Gessler to the Cray-Finne Company	705	761
64—Paper testified to by the witness Gessler as bearing his signature and dated April 4, 1932, as being a disclosure of an invention	711	762
65—Description of July 8, 1930, which is referred to at the top of Plaintiff's Exhibit 64	712	764
66 id.—Catalogs of the Carbide & Carbon Chemicals Corporation from 1930 to 1935	718	....
67—Smudged Montgomery Ward sheet	559	*

* Copy in separately filed book.

Defendant's Exhibits.

	Offered at Page	Printed at Page
A—Set of curves referred to by the witness Bragdon	577	
B—Letter dated May 1, 1934 from Mr. Sterner to Frank W. Cray	92	766
C—Copy of Patent No. 2,128,672, issued August 30, 1938	122	767
D—Memorandum testified to by the witness Hayward	208	
E—Filewrapper of the patent in suit	244	769
F—Plaintiff's answer to interrogatories	244	949
G—Book of patents and publications as follows:	246	

United States Letters Patent.

Patent Number	Patentee	Date	
380,654	Lefferts	Apr. 3, 1888	957
1,439,696	Doughty	Dec. 26, 1922	961
1,450,692	McElroy & Clarke	Apr. 3, 1923	963
1,752,462	Smith	Apr. 1, 1930	967
1,806,965	Clewell	May 26, 1931	969
1,884,553	Bradley	Oct. 25, 1932	971
1,858,673	Lawrence	May 17, 1932	976
1,954,450	Lawrence	Apr. 10, 1934	980
1,954,627	Jirousek	Apr. 10, 1934	983

---

*Copy in separately filed book.

PUBLICATIONS.

	Offered at Page	Printed at Page
Fly-leaf, pp. 12 and 13 and table of physical properties in Carbide & Carbon catalogue January 1, 1929, second edition		985
Industrial & Engineering Chemistry, April, 1931, p. 17, entitled "Custom Built Solvents" by Carbide & Carbon		989
Printing Equipment Engineer, Dec., 1931, pp. 9 and 25, entitled "Plastic Printing Inks for Rapid Drying"		990
H—Piece of paper on which the witness Taylor made demonstration	263	
I—Cardboard having on it four samples of printing, testified to by the witness Taylor	578	
J—Photostatic copy of the Brewer and Gardner article	270	*
K—Photostatic copy of the original of Chemical Society for 1888, pp. 42-45 inc., which is referred to in the footnote 6 of the Brewer and Gardner article	271	*
L-1—Photographs of the apparatus used L-2 by the witness Taylor to determine L-3 the vapor pressure characteristics of certain solvents	272	*
M—Report of Mr. Taylor on the vapor pressure of oil of cloves	275	*

* Copy in separately filed book.

	Offered at Page	Printed at Page
N—Data sheet made by the witness Taylor in determining the vapor pressure for butyl carbitol	278	
O—Chart referred to by the witness Taylor	295	
P—Set of curves identified by the witness Taylor	281	
Q—Set of curves showing solvents obtained from Lefferts and Stevens patent, including butyl carbitol and defendant's 502-C oil	282	
R—Sample container of defendant's solvent in the ink which is claimed to infringe	283	
S—Sample of the ink which was made up in accordance with the Doughty patent	286	
T—Sample of the Doughty ink produced by Mr. Taylor	287	
U—Sample of the Gessler ink	287	
V—Sheet identified and described by the witness Taylor	293	
W—Photograph illustrating the still used by the witness Taylor to obtain the petroleum fraction mentioned in the Doughty patent	294	
X—Report of Mr. Taylor on the vapor pressure of kerosene fraction	294	
Y—Tin of Lefferts and Stevens ink	299	
Z—Sample of high boiling petroleum fraction obtained according to the Doughty patent	299	

* Copy in separately filed book.

	Offered at Page	Printed at Page
A-1—Invoice and order identifying the kerosene used by the witness Taylor in making the solvent according to the Doughty patent	301	*
B-1—Distillation range chart testified to by the witness Taylor	304	*
C-1—Photograph of the standard equipment used for an A. S. T. M. distillation range test	305	*
D-1—Chart indicating the vapor pressures at various temperatures	306	*
E-1—Chart which is an enlargement of the vapor pressure chart given in "Industrial and Engineering Chemistry"	307	*
F-1—Print from a Montgomery-Ward catalog bearing the signature of the witness Taylor	312	*
G-1—Pages 316 and 317 of the 1942 Pharmacopoeia of the United States of America and p. 235 of the 1882 volume of the United States Pharmacopoeia	319	*
I-1—Straight line vapor pressure chart made and testified to by the witness Taylor	347	*
J-1—Photostatic copies of pp. 352 and the fly-leaf of the Mellon Institute book published in 1920	383	*
K-1—Four invoices dated January 2, January 29, January 30, and February 15, 1941, from Magie Brothers Petroleum Products to Sinclair & Carroll Company, Inc. (K-2, K-3, K-4)	397	*

* Copy in separately filed book.

	Offered at Page	Printed at Page
LL—Laboratory report marked "Laboratory No. 144,560 dated July 1, 1941 to Magie Bros. Oil Co. from Phoenix Chemical Laboratory, Inc."*	398	
M-1—Fly-leaf and pp. 124-128 inc. of Nelson's book entitled "Petroleum Refinery Engineering, First Edition", published in 1936	404	
N-1—Card produced by the witness Theuer showing the first printing of the September 1930 "Metal Progress"	425	
O-1—September 1931 issue of "Metal Progress"	487	
P-1—Printing record testified to by the witness Theuer	436	
Q-1 id.—Six page folder "Believe it or Not"	437	
R-1 id.—Formula for Jirousek ink	444	
S-1—Order and reorder of the Commer-		
T-1 cial Printing & Litho Company	474	
U-1—Sales slip of the A. L. Garber Company dated March 2, 1932	475	
V-1—Magazine offered in the deposition of witness Pellinger	487	
W-1—Issue of "Metal Progress" dated January 1932	487	
X-1—Issue of January 1932 "Your Garden and Home"	488	
Y-1—Issue of February 1932 "Your Garden and Home"	488	
Z-1—Issue of March 1932 "Your Garden and Home"	488	

* Copy in separately filed book.

	Offered at Page	Printed at Page
A-2—Invoice dated November 18, 1942, from Sinclair & Carroll to W. F. Hall Printing Co.	520	*
B-2—Metal can marked Sinclair & Carroll Company "Rotary Yellow, 1st Down, No. 20805"	525	....
C-2—Metal can marked "Rotary Red, Second Down, No. 20806"	525	....
D-2—Metal can marked "Rotary Black, Third Down, No. 20807"	525	....
E-2—Metal can marked "Rotary Blue, 4th Down, No. 20808"	525	....
F-2—Card dated November 3, 1942, entitled "Heat Set Varnish No. 20798"	522	*
G-2—Formula card dated November 5, 1942, marked "Rotary Yellow, 1st Down, No. 20805"	522	*
H-2—Formula card marked "Rotary Red, 2nd Down, No. 20806", dated November 5, 1942	522	*
I-2—Formula card dated November 5, 1942, marked "Rotary Blue, 4th Down, No. 20808"	522	*
J-2—Formula card dated November 5, 1942, marked "Rotary Black, 3rd Down, No. 20807"	522	*
KK—Montgomery-Ward Christmas book of 1942, page 59	554	*
LLL—Sheet of paper referred to by the witness Carroll as a "draw down"	529	....

*Copy in separately filed book.

	Offered at Page	Printed at Page
M-2—Certified copy of the filewrapper of the application serial No. 15,944 filed April 21, 1935, referred to in line 30, column 2 of p. 2 of the patent in suit	609	
N-2—Four patents which were submitted by the plaintiff in Plaintiff's Particular No. 4 as follows:	576	

UNITED STATES LETTERS PATENT.

Patent Number	Patentee	Date	
1,261,885	Wood, *et al.*	Apr. 9, 1918	993
1,592,806	Brunell	July 13, 1926	998
1,665,185	Brunell	Apr. 3, 1928	1005

BRITISH LETTERS PATENT.

249,472	Ullstein	1926		1013
O-2—Article in "Industrial and Engineering Chemistry" for July 1926 which was referred to in the filewrapper of the patent in suit			577	
P-2—Letter dated July 22, 1941 from Interchemical Corporation to Messrs. Nims & Verdi			579	1016
Q-2—Doughty Patent No. 1,439,695			583	1017
R-2—Comparative curves between butyl carbitol, the plaintiff's and defendant's solvent			672	
S-2—Samples of Alchemic Gold printing identified by the witness Satenstein			693	

* Copy in separately filed book.

	Offered at Page	Printed at Page
T-2—Assignment of the Doughty patents to Frederick H. Levey & Company in the fields of letter-press, lithographic and intaglio printing as stated in the assignment	694	1021
U-2—1929-1930 Carbide & Carbon Chemicals Corporation catalog (title page, table facing page 7 and pp. 16, 17)	722	
Opinion, Symes, D. J.		1024
Findings of fact and conclusions of law		1048
Judgment		1051
Plaintiff's motion for a new trial		1052
Affidavit in support of motion for new trial		1053
Affidavit in opposition to motion for new trial		1063
Opinion, Symes, D. J., on motion for a new trial		1065
Order denying motion for a new trial		1067
Notice of appeal		1068
Order extending time to docket appeal		1069
Further order extending time to docket appeal		1070
Further order extending time to docket appeal		1071
Order regarding exhibits		1072
Stipulation regarding record on appeal		1073
Further stipulation regarding record on appeal		1082
Stipulation as to correctness of record		1092
Certificate of Clerk		1093
Proceedings in U. S. C. C. A., Second Circuit		1094
Opinion, Hand, J.		1094
Petition for rehearing		1105
Order denying petition for rehearing		1118
Order for mandate		1119
Order allowing certiorari		1120

United States District Court

SOUTHERN DISTRICT OF NEW YORK

INTERCHEMICAL CORPORATION, Plaintiff, *v.* SINCLAIR & CARROLL CO., INC., Defendant.	Civil Action. No. 15-310.

Prefatory Statement.

1. The complaint was filed August 28, 1941, and charged infringement of United States Letters Patent No. 2,087,190. The only claims of said patent which are in issue in this suit are Claims 3, 10, 11, 12 and 13.

2. The plaintiff-appellant is Interchemical Corporation, an Ohio corporation. The defendant-appellee is Sinclair & Carroll Co., Inc., a New York corporation. There has been no change in the parties since this suit was started.

3. The defendant's answer was filed October 17, 1941, and an amendment to said answer was filed December 14, 1942.

4. The defendant was not arrested, no bail was taken and no property was attached.

5. The trial was held January 18, 19, 20, 21, 22, 25, 26 and 27, 1943, before Honorable J. Foster Symes, Judge of the United States District Court for the District of Colorado, sitting as a Judge in and for the Southern District of New York.

6. No question was referred to a commissioner, master or referee.

7. Final judgment was entered on July 7, 1943.

8. A motion for a new trial was served by plaintiff on defendant on July 13, 1943, and an order denying plaintiff's motion for a new trial was entered on August 30, 1943.

9. Notice of appeal was filed on September 13, 1943.

Complaint.

Plaintiff, for its cause of action, states:

1. This is a cause of action arising under the Patent Laws of the United States.

2. Plaintiff is a corporation organized and existing under the laws of the State of Ohio.

3. On information and belief, defendant is a corporation organized and existing under the laws of the State of New York and having a regular and established place of business and its principal office at 591 Eleventh Avenue, in the Borough of Manhattan, City and State of New York. Acts of infringement hereinafter complained of have been and are still being committed within the Southern District of New York and elsewhere within the United States.

4. Plaintiff is the owner of United States Letters Patent No. 2,087,190 duly and legally granted on July 13, 1937 to International Printing Ink Corporation, New York, N. Y., a corporation of Ohio, the name of which has since been changed to Interchemical Corporation, plaintiff herein.

5. Plaintiff has given defendant written notice of infringement of said Letters Patent.

6. On information and belief, defendant for a long time past has been and still is infringing said Letters Patent by making and selling, without license, printing inks embodying the invention claimed in said Letters Patent, and, unless enjoined by this Court, will continue to do so, causing great and irreparable damage to plaintiff.

Wherefore, plaintiff demands a preliminary and permanent injunction against further infringement by defendant and all those controlled by defendant; an accounting by defendant for profits and triple damages; an assessment of costs against defendant; and such other relief as this Court deems just and proper.

INTERCHEMICAL CORPORATION

By (Sgd) ROBERT W. BYERLY
Its Attorney

August 28, 1941

Of Counsel:
BYERLY, WATSON & SIMONDS,
225 Broadway,
New York, N. Y.

Answer.

Defendant, Sinclair & Carroll Co., Inc., for its answer to the Complaint in the above-entitled cause states as follows:

1. Defendant admits the allegations of paragraph 1 of the complaint.

2. Defendant admits the allegations of paragraph 2 of the complaint.

3. Defendant admits the allegations of paragraph 3 of the complaint, except that defendant denies that it has committed any acts of infringement whatsoever.

4. Answering paragraph 4 of the complaint, defendant admits that United States Letters Patent No. 2,087,190 were issued on July 13, 1937, to International Printing Ink Corporation. Defendant denies that such Letters Patent were "duly and legally issued". Defendant lacks knowledge or information sufficient to form a belief as to the remaining allegations of paragraph 4 of the complaint.

5. Defendant admits the allegations of paragraph 5 of the complaint.

6. Defendant denies the allegations of paragraph 6 of the complaint.

7. Further answering the complaint, defendant avers that said Letters Patent and each and all the claims thereof are invalid and void and of no force and effect because, in view of the prior state of the art and in view of what was common knowledge on the part of those skilled in the art at and prior to the time of the alleged invention of the subject-matter of said Letters Patent by Albert E. Gessler, the alleged inventor named therein, the invention purported to be patented thereby does not constitute patentable invention within the meaning of the Patent Laws of the United States.

Answer.

8. Defendant avers that said Letters Patent and each and all of the claims thereof are invalid and void and of no force and effect because the alleged inventions claimed therein and covered thereby and each and every substantial and material part thereof were, prior to the alleged invention thereof by the said Albert E. Gessler, or more than two years prior to the filing of his application for said Letters Patent, patented or described in each of the following Letters Patent and publications:

UNITED STATES LETTERS PATENT

Patent No.	Patentee	Date
380,654	Lefferts *et al.*	Apr. 3, 1888
410,208	Schupphaus	Sept. 3, 1889
716,318	Wass	Dec. 16, 1902
1,082,099	Putnam	Dec. 23, 1913
1,203,779	Putnam	Nov. 7, 1916
1,439,695	Doughty	Dec. 26, 1922
1,439,696	Doughty	Dec. 26, 1922
1,449,943	Hilton	Mar. 27, 1923
1,450,692	McElroy *et al.*	Apr. 3, 1923
1,471,746	McElroy *et al.*	Oct. 23, 1923
1,618,481	Shipley *et al.*	Feb. 22, 1927
1,618,482	Shipley *et al.*	Feb. 22, 1927
1,621,541	Hopkins	Mar. 22, 1927
1,715,209	Morris	May 28, 1929
1,725,649	Knight	Aug. 20, 1929
1,752,462	Smith	Apr. 1, 1930
1,806,965	Clewell	May 26, 1931
1,858,673	Lawrence	May 17, 1932
1,884,553	Bradley	Oct. 25, 1932
1,924,961	Reese	Aug. 29, 1933
1,954,450	Lawrence	Apr. 10, 1934
1,954,627	Jirousek	Apr. 10, 1934
1,966,907	Schneider	July 17, 1934
2,044,770	Bush	June 23, 1936

BRITISH LETTERS PATENT

Patent Number	Patentee	Date
914	Wass	1912
335,074	Johnson	1930
360,815	Imperial Chem.	1931

AUSTRIAN LETTERS PATENT

124,742	Kurz *et al.*	1931

PUBLICATIONS

"Lacquer Liquids", by Von Huckeroth, Circular No. 359, page 149 (Published January, 1930, by H. A. Gardner)

and many others, and in patents and printed publications which defendant has not as yet ascertained, but prays leave to insert in this answer by amendment as soon as discovered.

9. On information and belief, defendant avers that said Letters Patent and each and all of the claims thereof are invalid and void and of no force and effect because the alleged inventions claimed therein and covered thereby and each and every substantial and material part thereof were in public use in this country more than two years prior to the date of application of said Albert E. Gessler by the aforementioned patentees of the United States Letters Patent listed in paragraph 8 hereof and by:

Alchemic Gold Company, Inc., and American Book Bindery, Inc., and Stratford Press, Inc., all of 75 Varick Street, New York, N. Y., and Sinclair & Valentine Company, 611 West 129th Street, New York, N. Y., and by others at other places, the names and places being at the present unknown to the defendant but which defendant prays leave to insert in this answer by amendment as soon as discovered.

Answer.

10. On information and belief, defendant avers said said Letters Patent and each and all of the claims thereof are invalid and void and of no force and effect because the alleged inventions claimed therein and covered thereby and each and every substantial and material part thereof were, prior to the alleged invention and discovery thereof by Albert E. Gessler, known and used in this country by the aforementioned patentees of the United States Letters Patent listed in paragraph 8 hereof and by Alchemic Gold Company, Inc., and American Book Bindery, Inc., and Stratford Press, Inc., all of 75 Varick Street, New York, N. Y., and Sinclair & Valentine Company, 611 West 129th Street, New York, N. Y., and by others whose names defendant has not as yet ascertained, but prays leave to insert in this answer by amendment as soon as discovered.

11. Defendant avers that said Letters Patent and each and all of the claims thereof are invalid and void and of no force and effect because the description in said Letters Patent of the alleged invention and improvements set forth therein is not in such full, clear and exact terms as to enable any person skilled in the art to which it relates or with which it is most nearly connected to practice, use or operate the alleged invention thereof.

12. That said Letters Patent and each and all of the claims thereof are invalid and void and of no force or effect because the alleged invention or inventions described and claimed therein were and are inoperative and lack utility.

13. Defendant avers that the description contained in in the said Letters Patent are ambiguous and the disclosures therein are not in such full, clear, concise and exact terms as to enable persons skilled in the art to practice the same, and the claims of the patent fail to distinctly point out and distinctly set forth the method and product alleged to be the invention of the said Albert E. Gessler, and further, that for the purpose of deceiving the public the de-

scription and specifications filed in the United States Patent Office were made to contain less than the whole truth relevant to the original alleged inventions.

14. Defendant avers that while the application for said Letters Patent was pending in the United States Patent Office the applicant therefor so limited and confined the claims thereof, pursuant to requirements of the Commissioner of Patents, that plaintiff cannot now seek, have, or obtain constructions of such claims sufficiently broad to cover the product now manufactured and sold by defendant.

WHEREFORE, defendant prays that this Court adjudge and decree that said Letters Patent No. 2,087,190, and all the claims thereof, are invalid and void and of no force and effect and are not infringed by the defendant, and that the complaint herein be dismissed for want of equity, and that the defendant have judgment for the costs of this suit and for such other and further relief as equity may require or as this Court may deem meet and proper.

HOGUET, NEARY & CAMPBELL,
Attorneys for Defendant,
90 Broad Street,
New York, New York.

By (Sgd) WALTER H. FREE,
A member of said firm.

Amendment to Answer.

Now comes Sinclair & Carroll Co., Inc., defendant in the above-entitled cause, by its attorneys, Hoguet, Neary & Campbell, and amends its Answer as follows:

Add the following to Paragraph 8:

UNITED STATES LETTERS PATENT

Patent Number	Patentee	Date
872,777	Wickel	Dec. 3, 1907
1,315,377	McGiehan	Sept. 9, 1919
1,383,512	Barmier	July 5, 1921
1,575,940	Sawyer	Mar. 9, 1926
1,724,644	De Long	Aug. 13, 1929
2,081,949	Mock	June 1, 1937

BRITISH LETTERS PATENT.

295,118	Bain and Nixon	1928
320,410	Norris	1929
337,199	I. G. Farbenindustrie Aktiengesellschaft	1930

FRENCH LETTERS PATENT.

701,597	Magnin	1931

PUBLICATIONS.

"A Summary Of The Chemical Products of The Carbide and Carbon Chemicals Corporation", pages 12, 13, and "Physical Properties" table (Second Edition, published January 1, 1929, by Carbide and Carbon Chemicals Corporation, New York, N. Y.)

"Printing Ink Patents—Their Part In the Development of Ink Manufacture", by Joseph Rossman, pages 23 and 24 of the September, 1930, issue of "The American Ink Maker".

"Custom Built Solvents", Vol. 23, No. 4, page 17 (advertising section), April, 1931, issue of "Industrial and Engineering Chemistry".

"Plastic Inks For Rapid Drying", by M. E. Hanson, December, 1931, issue of "Printing Equipment Engineer", pages 9 and 25.

Amendment to Answer.

Add the following to Paragraph 9:

Charles Eneu Johnson and Company, 2000 Superior Avenue, Cleveland, Ohio, and Evangelical Press, 1900 Superior Avenue, Cleveland, Ohio, in conjunction with the patentee of said patent No. 1,954,627, Joseph F. Jirousek, of 673 East 118th Street, Cleveland, Ohio.

Add the following to Paragraph 10:

Charles Eneu Johnson and Company, 2000 Superior Avenue, Cleveland, Ohio, and Evangelical Press, 1900 Superior Avenue, Cleveland, Ohio, in conjunction with the patentee of said patent No. 1,954,627, Joseph F. Jirousek, of 673 East 118th Street, Cleveland, Ohio.

Add the following paragraph:

15. On information and belief, defendant avers that said Letters Patent in suit are invalid and void and of no force and effect, because the claims thereof here in issue were made more than two years after public sale and use in this country of the alleged invention described in said Letters Patent in suit.

HOGUET, NEARY & CAMPBELL,
Attorneys for Defendant,
90 Broad Street,
New York, N. Y.

By (Sgd) WALTER H. FREE,
A Member of Said Firm.

Service acknowledged this 11th day of December, 1942.

(Sgd) ROBERT W. BYERLY,
Attorney for Plaintiff.

Attorney for plaintiff consents to the filing of the above amendment without the entry of formal order . will raise no objection to the timeliness of the amendment.

(Sgd) ROBERT W. BYERLY,
Attorney for Plaintiff.

Plaintiff's Bill of Particulars.

Now comes Interchemical Corporation, plaintiff herein, by its attorney, and gives the following particulars in answer to the following requests by defendant:

1. Specify the claims of the Gessler Patent No. 2,087,190, in suit, upon which plaintiff will rely at the trial to support the allegation of infringement in the complaint.

Answer: As at present advised, plaintiff will rely on claims 3 and 10 to 15, inclusive.

2. Identify the specific ink or inks alleged to have been sold by defendant upon which plaintiff will rely to support the allegation of infringement in the complaint.

Answer: Inks sold by defendant in February, 1941, to Crowell-Collier, Springfield, Ohio, and called, respectively, Fisher Blue, Cudahy Blue, Fisher Red, Cudahy Red, Fisher Yellow, and Black.

3. Give the date on which plaintiff will rely at the trial as the date of invention of the patent in suit.

Answer: At the trial the plaintiff will not attempt to prove that the invention of the patent in suit was made prior to June 10, 1930.

4. Submit information, including descriptive matter and drawings or photographs, necessary to complete understanding of apparatus and/or process for effecting the step stated in lines 19 to 22, inclusive, column 2, page 2, of the patent in suit, as follows: "At the conclusion of the printing operation, the printed materials may be subjected, in a known manner, to sufficient heat to dry the thin film of the print very rapidly".

Answer: Plaintiff submits copies of the following patents:

Wood U. S. Patent No. 1,261,885,
issued April 9, 1918;
Ullstein British Patent No. 249,472,
published in 1926;
Brunell U. S. Patent No. 1,592,806,
issued July 13, 1926; and
Brunell U. S. Patent No. 1,665,185,
issued April 3, 1928.

5. Submit a certified copy of the complete file wrapper (including all amendments and Patent Office letters) of patent application Serial No. 15,944, filed April 12, 1935, by Albert E. Gessler, and stated in lines 31 to 32 of column 2, page 2, of the patent in suit, to be "in part a continuation of this application", and certified copies of any collateral Patent Office proceedings involving said "continuation" application Serial No. 15,944; or, in the alternative, at plaintiff's option, provide defendant's attorneys with written permission to inspect and make copies of the said "continuation" application Serial No. 15,944, and any said collateral proceedings involving the same.

Answer: A permit to inspect and make copies has been furnished to counsel for defendant by counsel for plaintiff.

6. State the meaning of the terms "liquid component" and "solid component" as used in the claims in suit.

Answer: Plaintiff, as at present advised, will contend at the trial that the term "liquid" in the patent in suit means any substance or substances that pour at room temperatures, and that the term "solid" in the patent in suit means any substance or substances that are non-pouring at room temperatures.

7. State the meaning of the word "stable" as used in claim 12 of the patent in suit.

Answer: Plaintiff, as at present advised, will contend at the trial that the word "stable" is used in claim 12 of the patent in suit in accordance with its ordinary meaning, viz., unchanging.

8. Furnish to defendant a true copy of each written license issued by plaintiff under the patent in suit.

Answer: A copy of each such license has been furnished to counsel for defendant by counsel for plaintiff.

(Sgd.) ROBERT W. BYERLY
Counsel for Plaintiff

Dated: New York, New York, December 11, 1942.

Defendant's Bill of Particulars.

Now comes Sinclair & Carroll Co., Inc. the defendant herein, by its attorneys, and gives the following particulars in answer to the following requests by plaintiff:

1. Specify all patents and publications which will actually be relied upon by defendant on the trial of this case to show the state of the prior art and common knowledge referred to in Paragraph 7 of the defendant's answer to the complaint.

Answer: Defendant, as at present advised, will rely at the trial on the following as indicative of the state of the art and common knowledge prior to the effective date of the patent in suit:

Patent Number	Patentee	Date
410,208	Schupphaus	Sept. 3, 1889
872,777	Wickel	Dec. 3, 1907
1,315,377	McGiehan	Sept. 9, 1919
1,383,512	Barmier	July 5, 1921
1,724,644	De Long	Aug. 13, 1929
1,806,965	Clewell	May 26, 1931
1,884,553	Bradley	Oct. 25, 1932
1,954,450	Lawrence	Apr. 10, 1934
2,081,949	Mock	June 1, 1937
(British) 320,410	Morris	1929
(British) 337,199	I. G. Farbenindustrie	1930
(French) 701,597	Magnin	1931

Defendant's Bill of Particulars.

PUBLICATIONS.

"A Summary Of The Chemical Products Of The Carbide and Carbon Chemicals Corporation", pages 12, 13, and "Physical Properties" table (Second Edition, published January 1, 1929, by Carbide and Carbon Chemicals Corporation, New York, N. Y.)

"Printing Ink Patents—Their Part In the Development of Ink Manufacture", by Joseph Rossman, pages 23 and 24 of the September, 1930, issue of "The American Ink Maker"

"Custom Built Solvents", (Vol. 23, No. 4, page 17 advertising section), April, 1931, issue of "Industrial and Engineering Chemistry"

"Plastic Inks for Rapid Drying", by M. E. Hanson, December 1931 issue of "Printing Equipment Engineer", pages 9 and 25.

3. Which of the patents and publications referred to in Paragraph 8 of the defendant's answer to the complaint will actually be relied upon by defendant on the trial of this case to anticipate the patent in suit?

Answer: Defendant, as at present advised, will rely at the trial upon the following patents in support of its allegation in the answer herein of anticipation of the patent in suit:

Patent Number	Patentee	Date
380,654	Lefferts and Stevens	Apr. 3, 1888
1,439,696	Doughty	Dec. 26, 1922
1,450,692	McElroy and Clarke	Apr. 3, 1923
1,752,462	Smith	Apr. 1, 1930
1,954,627	Jirousek	Apr. 10, 1934
(British) 295,118	Bain and Nixon	Aug. 9, 1928

3. Which of the alleged instances of prior use referred to in Paragraphs 9 and 10 of the defendant's answer to the

complaint will actually be relied upon by defendant on the trial of this case?

Answer: Defendant, as at present advised, will rely at the trial upon the following to show knowledge and use of the subject-matter of the patent in suit prior to the effective date thereof:

Alchemic Gold Company, Inc., New York, N. Y.
Sinclair & Valentine Co., New York, N. Y.
Joseph F. Jirousek, Cleveland, Ohio, and
Charles Eneu Johnson and Company, Cleveland, Ohio, and Evangelical Press, Cleveland, Ohio.

4. With respect to the alleged Alchemic Gold Company, Inc. prior knowledge and use specified in the answer to request No. 3 hereof, state:

(a) Each date when the use is alleged to have occurred.

Answer: From 1921 to date.

(b) The name and address of each person alleged to have knowledge thereof:

Answer: Howard W. Doughty, Amherst, Mass. Sidney Satenstein, 431 Canal Street, New York, N. Y.

(c) Each address at which the use is alleged to have occurred:

Answer: Alchemic Gold Company, Inc., and Stratford Press, at 406-426 West 31st Street, New York, N. Y.

(d) The ingredients of the material alleged to have been used and the proportion of each ingredient:

Answer: One such ink was composed of the ingredients mixed approximately in the proportions and in the manner described between lines 38 and 51 of page 2 of Doughty patent No. 1,439,696, issued to Alchemic Gold Company, Inc. Another such ink was composed of the ingredients mixed approximately in the proportions and in the manner described between lines 16 and 46 of page 2 of McElroy and Clarke patent No. 1,450,692, issued to Alchemic Gold Com-

pany, Inc. Another such ink was composed of the following ingredients mixed in the following approximate proportions: Three parts vehicle (comprising four parts terpineol and one part ordinary rosin), two parts rosin oil, one part ordinary rosin, and twelve parts pigment.

(e) With respect to each liquid ingredient of the material alleged to have been used, its chemical composition, its boiling range, the source from which it was obtained and the number or other designation by which it was identified by the supplier:

Answer: The solvent used was commercial terpineol, obtained from Antoine Chiris Company, Inc., 115 East 23rd Street, New York, N. Y., and had a boiling point of about 218° C. Terpineol is a hydrocarbon oil having the chemical formula $C_{10}H_{18}O$. The rosin oil was a commercial product obtained on the open market from a source not now known to defendant's attorney, who is, however, informed that it probably was obtained from said Antoine Chiris Company, Inc. According to Hackh's Chemical Dictionary, Second Edition (1937), the boiling point of rosin oil is 280° C., and its chemical formula is $C_{32}H_{16}$.

(f) The mode in which the alleged use was practiced and whether the material alleged to have been used was printed at room temperature and immediately thereafter dried or set by subjecting it or the material upon which it was printed to elevated temperatures:

Answer: The ink was printed on sheet material, including book cover material and paper, both sized and unsized, with the application of heat during printing to dry or set the printed ink, and the ink was also printed on paper at room temperature and subsequently dried.

(g) Whether the composition of the material alleged to have been used is set forth in any records, and, if so, describe each such record in detail and state the name and address of the person or persons having the custody or control thereof:

Answer: Said Doughty patent No. 1,439,696, and McElroy and Clarke patent No. 1,450,692, and formula records in custody of said Howard W. Doughty and said Alchemic Gold Company, Inc.

5. With respect to the alleged Sinclair & Valentine Company prior knowledge and use specified in the answer to request No. 3 hereof, state:

(a) Each date when the use is alleged to have occurred:
Answer: From 1921 to date.

(b) The name and address of each person alleged to have knowledge thereof:
Answer: George Kramer, c/o Sinclair & Valentine Co., 611 West 129th Street, New York, N. Y.
Charles Ziemann, c/o Sinclair & Valentine Co., 611 West 129th Street, New York, N. Y.
Harvey U. Locke, 755 Anderson Avenue, Cliffside Park, New Jersey.
Oliver Wolcott and Carl C. Barnes, c/o Southgate Press, Boston, Mass.
Fred Wykoff, c/o Harris & Partridge, Philadelphia, Pa.

(c) Each address at which the use is alleged to have occurred:
Answer: Southgate Press, Boston, Mass.
Harris & Partridge, 525 Locust Street, Philadelphia, Pa.

(d) The ingredients of the material alleged to have been used and the proportion of each ingredient:
Answer: Rotary Pictorial News 7496 Quick Dry, first sold by Sinclair & Valentine, August 23, 1921.

Pigment and dye	15.65%
Solvent (SONY 885 Ink Oil 72.8%, Kerosene 27.2%)	36.15%
Resin	38.71%
Other ingredients	9.49%
	100.00

Black Winter 66114, new, first sold by Sinclair & Valentine, January 13, 1923.

Pigment and dye	27.2 %
Solvent (90% Sony 885 Ink Oil, 10% Sony Kerosene)	22.3 %
Resin	30.7 %
Other ingredients	19.8 %
	100.00

Southgate Black 88020, first sold by Sinclair & Valentine, March 13, 1928.

Pigment and dye	21.05%
Solvent (73.4% Sony 885 Ink Oil, 26.6% Sony Kerosene)	31.75%
Resin	35.39%
Other ingredients	11.81%
	100.00

Composition Southgate Black 88378, first sold by Sinclair & Valentine April 9, 1928.

Pigment and dye	22.47%
Solvent (85.2% Sony 865 Ink Oil, 6.5% 885 Sony Ink Oil, 8.3% Sony Kerosene)	27.91%
Resin	37.21%
Other ingredients	12.41%
	100.00

(e) With respect to each liquid ingredient of the material alleged to have been used, its chemical composition, its boiling range, the source from which it was obtained and the number or other designation by which it was identified by the supplier;

Answer; "Sony" 885 Ink Oil, is a petroleum fraction having a boiling range from 575° F. (302° C) to 700° F.

(371° C.) and was supplied by Standard Oil Company of New York.

"Sony" 865 Ink Oil, is a petroleum fraction having a boiling range from 590° F. (310° C.) to 740° F. (393° C.) and was supplied by Standard Oil Company of New York.

"Sony" kerosene, is a petroleum fraction, having a boiling range from 340° F. (172° C.) to 550° F. (287° C.) and was supplied by Standard Oil Company of New York.

(f) The mode in which the alleged use was practiced and whether the material alleged to have been used was printed at room temperature and immediately thereafter dried or set by subjecting it or the material upon which it was printed to elevated temperatures.

Answer: The ink was printed at room temperature and immediately thereafter the print was subjected to heat to dry and set ink.

(g) Whether the composition of the material alleged to have been used is set forth in any records and, if so, describe each such record in detail and state the name and address of the person or persons having the custody or control thereof.

Answer: Ink compounders formula cards in custody of Sinclair & Valentine Co., 611 West 129th Street, New York, N. Y.

6. With respect to the Jirousek Evangelical Press, and Johnson Company prior knowledge and use specified in the answer to request No. 3 hereof, state:

(a) Each date when the use is alleged to have occurred:

Answer: 1928 to April, 1932.

(b) The name and address of each person alleged to have knowledge thereof:

Answer: Joseph F. Jirousek, 673 East 118th Street, Cleveland, Ohio.

Charles Theuer, 2000 Superior Avenue, Cleveland, Ohio.

Frank Pellinger, 4223 West 56th Street, Cleveland, Ohio.

Ed. Beres, 130-10 Soika Avenue, Cleveland, Ohio.
Lewis Nichols, 17416 Oxford Avenue, Cleveland, Ohio.

(c) Each address at which the use is alleged to have occurred:

Answer: Evangelical Press, 1900 Superior Avenue, Cleveland, Ohio.

Charles Eneu Johnson and Company, 2000 Superior Avenue, Cleveland, Ohio.

(d) The ingredients of the material alleged to have been used and the proportion of each ingredient.

Answer: As to inks prior to 1931, defendant's counsel is not now informed as to composition and proportions but when ascertained the information will be given promptly to plaintiff's counsel. As defendant's counsel is at present advised, the inks of 1931-1932 had the approximate composition and proportions set forth as the example in Jirousek patent No. 1,954,627, page 1, lines 53 to 70.

(e) With respect to each ingredient of the material alleged to have been used and chemical composition, its boiling range, the source from which it was obtained, and other information by which it was identified by the supplier:

Answer: The 1931-1932 inks described in answer to (d) hereof were made up of the ingredients named as obtained on the open market, from sources not presently known to defendant's counsel. Benzyl alcohol, specified as the solvent, has a boiling point of 204.7° C., according to Hackh's Chemical Dictionary, Second Edition (1937), and kerosene has a boiling range of approximately 172° to 287° C., according to Standard Oil Company of New York specifications.

(f) The mode in which the alleged use was practiced and whether the material alleged to have been used was printed at room temperature and immediately thereafter dried or set by subjecting it or the material upon which it was printed to elevated temperatures:

Answer: The ink was printed on paper at room temperature and immediately thereafter the print was subjected to heat to dry or set the ink.

(g) Whether the composition of the material alleged to have been used is set forth in any records and, if so, describe such record in detail and state the name and address of the person or persons having the custody or control thereof.

Answer: Jirousek patent No. 1,954,624, and formula records in custody of said Joseph F. Jirousek and said Charles Eneu Johnson and Company.

7. Specify each respect in which the description in the patent in suit will be claimed by defendant on the trial of this case to be defective as alleged in Paragraph 11 of defendant's answer to the complaint.

Answer: The patent in suit does not disclose a printing ink having the properties described in the specification thereof.

8. Specify each respect in which the invention of the patent in suit will be claimed by defendant on the trial of this case to be inoperative and lacking in utility as alleged in Paragraph 12 of the defendant's answer to the complaint.

Answer: The ink described by the patent in suit (1) is not stable (unchanging) on the printing press, and (2) deteriorates ink-distributing rollers as stated in patent No. 2,128,672, issued to plaintiff as assignee of Albert E. Gessler.

9. Specify each respect in which the description and disclosures contained in the patent in suit will be claimed by defendant on the trial of this case to be defective as alleged in Paragraph 13 of defendant's answer to the complaint.

Answer: The patent in suit does not disclose a printing ink having the properties described in the specification thereof.

Defendant's Bill of Particulars.

10. Specify each respect in which the claims of the patent in suit will be claimed by defendant on the trial of this case to be defective as alleged in Paragraph 13 of defendant's answer to the complaint.

Answer: The claims in suit do not define the printing ink described in the specification of the patent in suit.

11. Specify each respect in which the defendant will claim on the trial of this case that the patent in suit was made to contain less than the whole truth relevant to the invention of the patent in suit as alleged in Paragraph 13 of the defendant's answer to the complaint.

Answer: The matter between line 9, column 1, line 2, column 2, page 1, of the patent in suit, is not an accurate or entire description of art prior to the filing date of the patent in suit.

12. Specify each respect in which the defendant will claim on the trial of this case that the prosecution of the application for the patent in suit requires a construction of the claims thereof which is not sufficiently broad to cover the product manufactured and sold by defendant as alleged in Paragraph 14 of defendant's answer to the complaint.

Answer: Plaintiff is estopped by the prosecution of the application for the patent in suit from claiming that the claims in suit cover defendant's accused inks, because, prior to amendment "G" filed October 10, 1935, the application for the patent in suit contained broad claims which were relinquished by plaintiff on said date pursuant to rejection thereof by the Commissioner of Patents and were eventually replaced by claims not sufficiently broad to cover the defendant's product charged by plaintiff to infringe the patent in suit.

HOGUET, NEARY & CAMPBELL,
Attorneys for Defendant.

By (Sgd.) WALTER H. FREE.

Dated: New York, N. Y., December 11, 1942.

Minutes of Trial.

Before:

HON. JOHN FOSTER SYMES,

District Judge.

New York, January 18, 1943,
10:30 o'clock a. m.

Appearances:

ROBERT W. BYERLY, Esq., Attorney for Plaintiff; ROBERT W. BYERLY, Esq., and RALPH M. WATSON, Esq., of Counsel.

HOGUET, NEARY & CAMPBELL, Esqrs., Attorneys for Defendant; WALTER H. FREE, Esq., and JOHN F. NEARY, JR., Esq., of Counsel.

(28)* PRIMA FACIE PROOFS.

Mr. Byerly: I offer some exhibits. The first is a stipulation as to proofs, which is the usual stipulation permitting use of copies of patents (29)* and publications. The stipulation also admits the corporate status of the parties and refers to the change in name of the plaintiff, which was originally called International Printing Ink Company and is now called Interchemical Corporation.

(Marked Plaintiff's Exhibit 1.)

Mr. Byerly: Next I shall offer as Exhibit 2 the patent in suit. Has your Honor a copy of the patent?

The Court: I have one here.

(Marked Plaintiff's Exhibit 2.)

Mr. Byerly: The patent shows on its face that it was issued to The International Printing Ink Corporation, which is the former name of the plaintiff, so there is no need of proof of title. But I should like to offer assignment from Zinsser & Company to the plaintiff, dated April

* Parenthesized numbers in the text refer to the pages of the trial minutes.

2, 1935. That may be of some relevance in showing the date on which the plaintiff obtained title to the application on which the patent was issued.

(Marked Plaintiff's Exhibit 3.)

Mr. Byerly: I should now like to offer the defendant's answers to plaintiff's interrogatories 1 to 5 and 8 to 12. Those are on file, and I do not know whether your Honor would like to have them read or what (30) would be the best way——

The Court: What are they?

Mr. Byerly: These are the answers to plaintiff's interrogatories.

The Court: Just file them and I will read them.

Mr. Byerly: They are already on file.

Do you have the file here, Mr. Clerk?

The Court: You referred to certain of these interrogatories or do you want all of them?

Mr. Byerly: Your Honor, I would like to offer 1 to 5 and 8 to 10. They might be deemed marked Plaintiff's Exhibit 4.

(Deemed marked Plaintiff's Exhibit 4.)

The Court: Well, there are two sets of answers here. 1 to 5 is referred to in the first paper; and the second you say is 8 to 10?

Mr. Byerly: Are there two sets, your Honor?

The Court: I do not know whether they are duplicates or not—no, they are not.

Mr. Byerly: Perhaps one relates to a bill of particulars and the other to interrogatories, as I remember it.

The Court: You pick out the ones which you want the Court to pay attenion to.

Mr. Byerly: These are the ones that I am (31) offering. These are defendant's answers to plaintiff's interrogatories. The defendant's answers to plaintiff's interrogatories I am offering are 1 to 5 and 8 to 10.

The Court: Very well.
Mr. Byerly: I will call Mr. Bradgon.

CHARLES R. BRAGDON, called as a witness on behalf of the plaintiff, being duly sworn, testified as follows:

Direct examination by Mr. Byerly:

Q. Mr. Bragdon, you are a chemist employed by the plaintiff? A. I am.

Q. Will you state briefly your education as a chemist and your previous activities as a chemist? A. Graduate of Northwestern University and of Massachusetts Institute of Technology——

The Court: Is it necessary to have these witnesses qualified or will their qualifications be admitted?

Mr. Free: I will admit it. Maybe Mr. Byerly wants to make an appeal record.

The Court: All right.

Mr. Byerly: It won't take but a moment.

The Court: Go ahead, then.

A. (Continuing) I was employed by Robert A. Worstall, a consulting chemist to the paint, varnish (32) and printing ink industries from 1909 to 1915, with an interval of a year and a half when I was chief chemist of the Glidden Varnish Company, Cleveland.

Since 1915 I have been with the plaintiff or associated companies. For 18 years I was with the Ault & Wiborg Company as chemical director of the varnish works. In 1934 I was transferred to the research laboratories of Interchemical Corporation, which is the parent company.

The Court: The plaintiff here?

The Witness: The plaintiff, yes, your Honor. That is the parent company of Ault & Wiborg.

Q. Have you read and do you understand the patent in suit, Mr. Bragdon? A. I have and I do.

Q. I notice in the patent in a number of places the expression "vapor pressure" occurs.

Mr. Byerly: If your Honor will permit I will hand the witness a copy of the patent. It may be convenient (handing to witness).

Q. (Continuing) Can you tell us what the expression "vapor pressure" means? A. It is a characteristic of liquids which regulates the evaporation of portions of the liquid changing from a liquid into the gaseous state. The molecules of liquids are commonly supposed to be in rapid motion and as they come to the surface of the liquid some of them escape into the space above (33) the liquid.

The Court: Is that what evaporation is, the escape of these molecules?

The Witness: That is it.

The Court: All right.

A. (Continuing) The tendency of these molecules to escape depends partly on the chemical character of the liquid itself and partly on the temperature. As the temperature would rise the molecules are in more rapid motion and more of them tend to escape into the space above the liquid.

By the Court:

Q. It depends on two things, on the temperature and—what was the other? A. On the chemical composition of the liquid itself. Each liquid, each pure chemical liquid has its own characteristic vapor pressure at any given temperature. The vapor pressure is produced by the bombard-

ment of these molecules in the space above the liquid against the walls of the vessel in which it may be confined.

Q. Well, the atmosphere might act as a wall, wouldn't it? A. The atmosphere tends to hold these molecules down there.

Q. Just like a wall or container? A. Very much like a wall, although in time the particles will be diffused (34) through the air. As the temperature is raised the more rapid motion of these molecules causes the vapor pressure to increase.

Q. The temperature increases the motion of molecules? A. Yes.

The Court: All right, go ahead.

A. (Continuing) That is the general explanation of vapor pressure.

By Mr. Byerly:

Q. If a liquid is actively boiling how is its vapor pressure? A. Its vapor pressure is then equal to the pressure of the atmosphere above it.

Q. In what units is vapor pressure measured? A. It is measured either in inches, in centimeters or in millimeters. The ordinary pressure of the atmosphere is about 30 inches or about 76 centimeters or 760 millimeters.

Q. And that being the measurement obtained from a column of mercury in a barometer? A. That is right. The column of mercury exactly balances the pressure of the air on the surface of the mercury in the dish in which the barometer is inserted.

Q. Vapor pressure is usually measured in that same terminology, that is, in inches or centimeters, meaning the equivalent column of mercury? A. That is correct.

(35) Q. Then is it correct to say that the vapor pressure of a liquid is about 76 centimeters when the liquid is

actively boiling at atmospheric pressure, at ordinary atmospheric pressure? A. That is right.

Q. The patent refers, near the bottom of page 1, to diethylene glycol monobutyl ether as an example of a peculiar class of solvents.

The Court: Where is that?

Mr. Byerly: That is at the very end. It is the last three lines on page 1 of the patent:

"Among this peculiar class of solvents I have found as an example diethylene glycol monobutyl ether."

Q. (Continuing) Are you familiar with this solvent, Mr. Bragdon? A. I am.

Q. What is its ordinary commercial name? A. Butyl carbitol.

Q. Tell us about its vapor pressure characteristics. A. It has three special characteristics. The vapor pressure at room temperature is very low. It is given by Brewer and Gardner, who are consulting chemists in Philadelphia, in a paper which they published several years ago as .02 of a millimeter, at 20 degrees Centigrade. The vapor pressure increases rapidly when the liquid is heated and at about 150 degrees Centigrade (36) it is in the order of centimeters, about 6 centimeters. The third characteristic is that as the evaporation of butyl carbitol proceeds the vapor pressure remains nearly constant. That is because butyl carbitol is a pure, a nearly pure chemical substance, a definite chemical compound, and those compounds are characterized by having a uniform vapor pressure, and no matter whether you have a large amount present or a small amount present the vapor pressure remains at the same figure.

Q. Let us consider for a moment these three characteristics separately. You have said that at room temperature the vapor pressure is very low. The patent itself states

at line 68, page 2, column 1—it gives the vapor pressure as .02 of a millimeter, stating that that is taken from Brewer and Gardner's measurements, does it not? A. It does.

Q. In the first place have you looked at the Brewer and Gardner article? A. Yes.

Q. Is that correctly stated? A. That is correctly stated.

Q. Do you know of any other measurements which tend to confirm or contradict that figure? A. The manufacturer of butyl carbitol, the Carbide & Carbon Chemicals Corporation, have published the figures showing that the vapor pressure of butyl carbitol at 20 degrees is about .05 of a (37) millimeter, which is a little higher than this figure given here. It is very difficult to make measurements of such very small differences in pressure accurately at room temperatures, and most of these measurements are made by determining the vapor pressure at somewhat higher temperatures where it is large enough to be measured more accurately and then drawing a curve through a series of points which will usually lie on the definite line and continuing the line to a 20 degree point and determining the figure in that way.

Q. In view of this impossibility of measuring directly, accurately, would it be correct to say that the various measurements which you have considered and seen indicate that the vapor pressure is certainly on the order of hundredths of a millimeter, 20 degrees? A. It is in that general range, very, very small, about a hundredth of a millimeter.

Q. While you are not a printer I suppose you have seen a printing press in operation? A. I have.

Q. Do you know how the ink is applied to the type or to the printing cylinder? A. It is fed into a fountain, a sort of a trough from which it is taken by rollers. The first rollers turn rather slowly and they pass along some of the ink to secondary distributing rollers which are turning a little faster and some of them (38) are also moving back and forth in the direction of their axis. There is a series of——

The Court: One picks up the ink and then the other coming in contact with it takes ink off it?

The Witness: That is right.

The Court: At the same time it is moving——

The Witness: Lengthwise.

The Court: Lengthwise?

The Witness: Yes. There may be a train of 12 to 15 or 18 such rollers before the ink is brought to the plate which carries the type. The film of ink gradually becomes thinner and thinner and more uniform as it is gradually brought to the plate.

Q. Have you any idea of the thickness of the film on the rollers, say getting towards the type but has not quite got to it? A. It is very thin. The measurements that we have made in our laboratories indicate that it would be on the order of about a thousandth of an inch, about 20 microns.

Q. What is a micron? A. A micron is one-thousandth of a millimeter.

Q. How does a film of that thickness compare with the thickness of an ordinary piece of paper? A. Well, that is about 1/15th or thereabouts of the thickness of a piece of paper.

(39) Q. So it is a very thin film? A. Very thin indeed.

The Court: These are metal rollers, aren't they?

The Witness: A few of them are metal but many of them are either rubber or rubber composition or glue and glycerin, depending on the type of press that is used.

The Court: What is the idea of having that movement on the axis of the roller, to scrape ink along?

The Witness: To scrape the ink along and make the ink more uniform. It may be that there might be a low place in one of the rollers, for instance, that takes the ink from the fountain, which would pick up a very much larger volume of ink at that place, and

by having this motion lengthwise the ink film is made more uniform, spread out.

Q. I notice that the patent on page 2, beginning with the first paragraph, in the second column says, at line 17:

"With ink prepared as above, the printing operation may be carried out in the ordinary manner and at ordinary temperatures."

The ink referred to is one which contains the solvent butyl carbitol, which you have mentioned. Does that statement in the patent, in view of what you know about butyl carbitol, give you any indication of how, if at all, butyl carbitol will evaporate from a film of ink which, (40) as you have said, on the rollers is only about 20 microns thick? A. It would evaporate very slowly. It would probably be still soft after half an hour or an hour.

Q. If that were not so you could not print in the ordinary manner at ordinary temperatures with this ink, could you? A. No. It would be apt to get sticky and stop the press.

Q. Consequently, the patent indicates that an ink with a vapor pressure as low as that of butyl carbitol at 20 degrees, that is, at room temperature, does not evaporate from these thin films when on the press, is that correct? A. That is correct.

Q. Now let us take up the second feature of the vapor pressure of butyl carbitol which you mentioned, that the vapor pressure rises very rapidly with a moderate increase in temperature.

Mr. Byerly: I will ask the clerk to mark this paper for identification so that we can refer to it.

(Marked Plaintiff's Exhibit 5 for identification.)

Q. I will show you a paper containing some graphs which has been marked Plaintiff's Exhibit 5 for identifica-

tion. One of the lines on that paper is marked "butyl carbitol". Does that indicate the vapor pressure of butyl carbitol at different temperatures (handing to witness)? A. It does.

(41) Q. I have another copy here if you would like to place the original before the Court.

(Original handed to Court by witness.)

A. The heavy curved line to the left gives the data determined by vapor pressure measurements of butyl carbitol at various temperatures from ordinary temperatures on up to 150 degrees Centigrade. This is on a scale which does not permit the 150-degree reading to appear, but it would come at a point about 6 centimeters.

The Court: When you speak of pressure that is an expansive pressure you are talking about?

The Witness: Yes.

Q. Does the scale of this graph permit showing what the vapor pressure of butyl carbitol is at room temperature, 20 degrees Centigrade? A. No, it does not. The scale is not big enough to permit that to be shown. It is so near zero that you cannot see the difference.

Q. I call your attention to a statement in the patent which occurs near the top of the first column on page 2, beginning at line 4, and referring to butyl carbitol the patent says:

> "When heated to about 100° C. or above, the rate of vaporization is greatly accelerated and, when used in the ink of this invention, produces a print which dries almost instantaneously when (42) subjected to such a heat treatment."

The ink which is placed on paper in printing is a rather thin film, is it not? A. It is very thin.

Q. Have you any measurement which gives some idea as to how thick that film is? A. It is very hard to measure accurately, but it is in the order of 2 to 4 microns, which would be about 1/15,000ths of an inch.

Q. According to your graph what is the vapor pressure of butyl carbitol at 135 degrees Centigrade? A. At 135 it is about 3½ centimeters.

Q. What is it at 140? A. At 140 it is about 4 centimeters.

Q. How does that compare with the vapor pressure of alcohol at room temperature? A. Vapor pressure of alcohol at room temperature is about 4 centimeters, so that it would be just about the same as butyl carbitol at 140 degrees.

Q. I have called your attention to the statement in the patent beginning at line 4, page 2, where it is stated that when an ink containing butyl carbitol, that is, when a print of an ink containing butyl carbitol is heated to about 100 degrees Centigrade or above the print dries almost instantly. Is there any way you can illustrate the drying of a print when the vapor pressure of the solvent in the ink is, say, 4 centimeters, (43) the same as that of ethyl alcohol? A. Yes. I have had prepared an ink which consists of a pigment ground in a vehicle consisting of nitrocellulose and resin in alcohol, ordinary alcohol. That is purely for illustrative purposes. It is not a practical printing ink but it will illustrate how the ink will behave when the solvent has a vapor pressure of 4 centimeters.

Q. This is not the ink described in the patent? A. It is not the ink described in the patent but it is similar to it except for the solvent.

Q. This ink, if I understand you correctly, should illustrate how the patented ink behaves, how the specific ink mentioned in the patent behaves when it is heated up to 135 degrees Centigrade? A. That is correct.

By the Court:

Q. The reason you use a solvent is in order to take the liquid out of the ink? A. Yes, sir.

Q. To make it flow? A. The resin is a solid material, and in order to make it liquid you have to use the solvent.

Q. And this butyl carbitol is a solvent? A. Butyl carbitol is a solvent. It is a water-white liquid.

Q. Used by the plaintiff? A. Used by the plaintiff, yes, sir.

By Mr. Byerly:

Q. Now using this ink made with the solvent which has (44) a vapor pressure of 4 centimeters at room temperature will you please demonstrate to the Court how it would dry?

The Court: And the drying process means getting rid of the solvent?

The Witness: Yes.

The Court: Leaving the residue?

The Witness: Yes.

The Court: Which makes the impression?

The Witness: That is correct.

A. I smear a little of the ink here on the paper; take this knife and draw it down to a very thin film (indicating). You can see that that is dry already. I will mark that "alcohol ink". (Writing.)

The Court: That means the alcohol is all evaporated?

The Witness: That is correct.

Q. Mr. Bragdon, is it necessary to heat up butyl carbitol until its vapor pressure is exactly equal to that of ethyl alcohol to get this rapid drying of a thin film on a paper? A. No, it does not need to be that high. Any vapor pressure on the order of a few centimeters is sufficient to cause rapid evaporation.

Q. What is the vapor pressure of ethyl alcohol, say at 115 degrees Centigrade? A. The vapor pressure of butyl (45) carbitol do you mean?

Q. Yes, that is what I meant to say, I am sorry. A. At 115 degrees it is about 1½ centimeters.

Q. Have you prepared an ink having a solvent whose vapor pressure is 1½ centimeters at room temperature? A. I have. It is made with secondary butyl acetate, another volatile liquid, as the solvent.

The Court: Is that described in this curve here, the second curve, "butyl carbitol"?

The Witness: No. This is butyl acetate. This is a different chemical compound. Its vapor pressure is not shown in the curve.

The Court: All right.

A. (Continuing) I have selected that merely because its vapor pressure at room temperature is 1½ centimeters, which is the same as butyl carbitol at about 115 degrees Centigrade. I will demonstrate that in the same way.

Q. Here is some more soft paper if you need it to clean up with (handing to witness). A. Thank you. (Demonstrates on paper.)

That is now dry (indicating to Court).

Q. You have drawn this second ink down into a thin film on a piece of paper, Mr. Bragdon? A. I drew that down into a thin film on a piece of paper and that dried immediately.

(46) The Court: How does the thinness of that film there compare with the thinness on the printing press?

The Witness: It is very nearly the same thing.

The Court: The same thickness or thinness, rather?

The Witness: Yes.

Q. Did you find that the film on paper of this ink whose solvent has a vapor pressure of a centimeter and a half at room temperature dried very quickly? A. It does, almost as fast as the film made with ethyl alcohol.

Q. The drying of the film is a matter of seconds, is it not? A. It is.

Q. Or possibly a fraction of a second. I mean it isn't longer than that.

The Court: Is there any objection in the art to having it dry too quickly?

Mr. Byerly: Not after it gets on the paper, your Honor.

The Court: You do not want it to evaporate before it gets on the paper?

Mr. Byerly: Yes. It is very fatal if it evaporates before it gets on the press.

Now I think I will ask the clerk to mark these (47) samples. I will offer in evidence a sample of ink with an alcohol solvent, used by the witness. That will be Plaintiff's Exhibit 6.

(Marked Plaintiff's Exhibit 6.)

Mr. Byerly: I will now offer the film of ink on paper, the ink being that of Plaintiff's Exhibit 6.

(Marked Plaintiff's Exhibit 7.)

Mr. Byerly: I will now offer the second ink sample used by the witness, being the ink whose solvent is butyl acetate, having a vapor pressure of 1½ centimeters at room temperature.

(Marked Plaintiff's Exhibit 8.)

Mr. Byerly: And I offer the film made with that ink. I ask to have that marked as Plaintiff's Exhibit 9.

(Marked Plaintiff's Exhibit 9.)

Q. These inks which you have used, for exhibit purposes, could these be used in ordinary printing? A. They could not. They evaporate so fast that they would gum up the press, as it is called.

Q. Have you a sample of an ink made with the solvent referred to in the patent? That is, butyl carbitol. A. We have an ink here which is made with butyl carbitol. It is similar to the ink described in the patent except that it is made with a black pigment instead of yellow.

(48) Q. Now you have said that the vapor pressure of that solvent at room temperature is very low, on the order of one hundredth of a millimeter? A. That is correct.

Q. Will you spread a little of that ink on paper the same way that you did with the other inks and see what happens.

The Court: What do you call this?

The Witness: This is a butyl carbitol ink.

Mr. Byerly: This is the ink of the patent, your Honor.

(Witness demonstrates.)

A. You will find that this ink will not dry for some time. I have taken the ink and drawn it down with a scraper and I mark it "butyl carbitol ink". (Writing.)

Q. Has that film of ink dried the way the other inks did? A. It has not. It is still very smeary.

Q. Now if that paper with the ink on it were held up to a temperature somewhat above 100 degrees Centigrade how would the ink behave? A. It would behave in the same way that the ink made with alcohol or butyl acetate behaves. It would dry in a matter of a fraction of a second.

Q. In other words, as I understand it the heating of the paper, which is not easy to demonstrate in court, transforms an ink such as you have just placed on the paper into an ink which behaves like the inks which you (49) spread on the paper in making Plaintiff's Exhibit 7 and 9? A. That is correct.

The Court: What exhibit will that be?

Mr. Byerly: I will now offer the butyl carbitol ink as Plaintiff's Exhibit 10.

(Marked Plaintiff's Exhibit 10).

The Court: Is it dry yet?

The Witness: No, that won't be dry for about 48 hours at least.

The Court: It will have gone in the press long before then?

The Witness: In the press with heat it will dry instantaneously on paper.

Mr. Byerly: I offer that paper in evidence.

(Marked Plaintiff's Exhibit 11).

The Witness: I can demonstrate that that ink is still wet by placing another piece of paper over it.

Q. Will you place a piece of paper over Plaintiff's Exhibit 11 (handing to witness). A. (Demonstrating) This is the smudge that is taken off.

Q. Will you do the same thing with Plaintiff's Exhibits 7 and 9 and see if anything comes off. A. (Demonstrating) This is 9. You see it is clear. (Demonstrating) This is Exhibit 7; no smudge comes off.

The Court: You have to control the temperature (50) of these rollers, don't you? If the rollers should happen to get hot it would evaporate before it got to the paper?

The Witness: It would, possibly slightly, but the temperature of the rollers does not get hot enough to cause any appreciable amount of evaporation.

Q. In connection with the Court's question I call your attention again to this graph, Plaintiff's Exhibit 5 for identification, the butyl carbitol curve there seems to run into

the base line at about 50 degrees Centigrade; is that right? A. About there.

Q. How much Fahrenheit is 50 degrees Centigrade? A. 50 degrees Centigrade is about 120, I think—about 122.

Q. If through some accident the printing press got heated up above 100 degrees Fahrenheit, that is, on a very hot day, even then the vapor pressure of butyl carbitol would not rise much, would it? A. Even then the vapor pressure of butyl carbitol would be so low that there would be very, very slow evaporation.

The Court: Would you say that it is constant irrespective of the temperature?

The Witness: No. There is a slight change as the temperature goes up, but the differences from one temperature to another are so very small that they are very hard to detect.

(51) Q. You are referring now to the low temperatures? A. To the low temperatures.

Q. Below 50 degrees Centigrade? A. Below 50 degrees Centigrade, yes.

Q. Of course when you get to temperatures above 100 degrees C. the rise in vapor pressure is very rapid, is it not? A. Yes, above about the point 100 degrees Centigrade the curve approaches almost a vertical line.

Q. And that is why you have said that the vapor pressure above 100 degrees Centigrade is on the order of centimeters whereas at room temperature you have to measure it in hundredths of a millimeter? A. That is correct.

Q. Let me see, that is an increase of about a thousand to one, isn't it? A. That is an increase of the order of a thousand times.

Mr. Byerly: I will offer in evidence the sheet which the witness placed on top of Exhibit 11.

(Marked Plaintiff's Exhibit 12.)

Mr. Byerly: I simply show that, your Honor, because even one-hundredths of a millimeter of vapor pressure might cause drying before the case was concluded, we will have a record of the fact that it was wet.

Q. As I understand it, Mr. Bragdon, no ink came off on the sheets which you placed over Exhibits 7 and 9? (52) A. No. The paper is still perfectly white.

Q. Mr. Bragdon, I should like to come now to the third feature of butyl carbitol vapor pressure, which you have mentioned, and that I think you said was the fact that the vapor pressure remained constant while the liquid was evaporating; is that correct? A. That is correct.

The Court: What is that again?

Q. The third feature is that the vapor pressure remains constant while the liquid is evaporating. Putting that in another way, I take it you mean when the liquid is evaporating it continues to evaporate at substantially the same rate until it is all gone? A. That is correct. Being a single chemical compound it continues to evaporate at the same rate. It has the same vapor pressure from 100 per cent to zero. If it were a mixture of chemical compounds the vapor pressure would change during the course of the evaporation.

Q. Now I will show you another graph——

Mr. Byerly: First I will have this marked for identification.

(Marked Plaintiff's Exhibit 13 for identification.)

Q. Mr. Bragdon, will you now look at the graph, Plaintiff's Exhibit 13 for identification, and particularly at the line marked "butyl carbitol" and point out what (53) that

indicates (handing to witness). A. That is a vapor pressure, a line representing the vapor pressure measurements taken on a sample of butyl carbitol at various stages during evaporation. The first 10 per cent has been cut off here because that represents the accidental impurities, gases, water and so forth.

By the Court:

Q. In other words, the first 10 per cent—where is that? A. That is to the left of this line, which are present in commercial preparations.

Q. This is all at the same temperature? A. These are all made at 150 degrees Centigrade and they show that butyl carbitol beyond the first 10 per cent, which is evaporated, has an almost constant vapor pressure a little above 6 centimeters.

Q. Where does that appear? A. Over here (indicating).

Q. That is going up in that line? A. This is the per cent of residue.

Q. Residue left? A. Yes. In other words, when you have 100 per cent the vapor pressure would be somewhere up here (indicating).

Q. And when you have no residue left? A. Well, that means 100 per cent of the total sample as you begin your measurement.

Q. The total in volume you mean? A. Yes. It is (54) the entire sample.

Q. Well residue is all that you have left when you get up here (indicating)? A. Yes.

Q. You start here with the butyl solvent and then the residue is left, and as this line goes up the solvent gradually leaves? A. No, it is the other direction. You start with the sample containing 100 per cent of the whole material as supplied by the manufacturer at this point, and then gradually evaporate off, little by little. At this point you have 90 per cent left (indicating).

At this point 80 per cent (indicating). At this point 70 per cent (indicating), and so on until down here you would have none of the sample left then.

Q. Everything would be gone? A. Everything would be gone.

Q. What becomes of the residue? Does it evaporate off? A. The residue continues to have a vapor pressure at the same figure of a little over 6 centimeters clear down as far as it was measured, which is a little over above 30 per cent in this case.

Q. Where would the last of the butyl carbitol be? A. Presumably——

Q. Away down here (indicating)? A. Away over here (indicating). This line would be continued. In other words, when you got down to the last drop of butyl carbitol (55) assuming it was good to the last drop, the vapor pressure would still be the same, 6 centimeters.

Mr. Byerly: I think perhaps the word "residue" is a little confusing there, your Honor.

By Mr. Byerly:

Q. By "residue" you simply intend to indicate the point to which the evaporation has proceeded? A. That is it. That is the amount left of the original sample.

Q. You do not mean that it is something different?

The Court: Well, there are certain elements in it that do not evaporate at all. It is only the butyl carbitol that leaves or evaporates, is that right? It gradually leaves more of the solid or residue?

The Witness: Well, these tests were made on the pure solvent, not on inks.

The Court: I understand.

The Witness: These are tests made merely to determine the vapor pressure characteristics.

The Court: Of butyl carbitol?

The Witness: Of butyl carbitol, yes.

The Court: This was not on ink?
The Witness: No.
The Court: I see.

Q. And consequently the word "residue" on the bottom has no relation to the other ingredients of the ink? A. No.

(56) Q. It means merely a stage in the evaporation of the butyl carbitol in which the measurements were taken? A. Yes.

The Court: And you read this from left to right?
The Witness: That is correct.

Q. Now how does ordinary petroleum, like kerosene, act when it is evaporated? Does it have a constant vapor pressure? A. No, it does not. It is a mixture of a number of chemical compounds, with various proportions of carbon and hydrogen, and the more volatile portions evaporate at the start and leave less volatile portions behind so that the vapor pressure is continually dropping during the course of the evaporation.

Q. Does that mean the rate of evaporation is continually decreasing? A. It does. As the vapor pressure drops the rate of evaporation goes down.

Q. Will you point that out to the Court, calling attention to the line marked "kerosene" on the graph, Plaintiff's Exhibit 13 for identification? A. This line here is drawn to represent the vapor pressure measurements on a sample of kerosene which was tested in the same way as the butyl carbitol. The vapor pressure at 10 per cent would be up here somewhere (indicating). We have neglected the first 10 per cent as possibly representing some unavoidable impurities, but at 90 per cent residue that (57) means when you have taken off the first 10 per cent the vapor pressure is a little above 12 centimeters. At 80 per cent is about 9½, and it keeps on dropping until at 30 per cent is down to about 3 centimeters.

The Court: That is a slower evaporation?

The Witness: That would be a much slower evaporation, yes.

Q. Now I call your attention to a statement in the patent beginning at line 53, column 1, page 2, which says:

"The diethylene glycol monobutyl ether may be replaced by other solvents or solvent-mixtures possessing a similar low rate of evaporation at ordinary temperatures and a marked acceleration of volatility at raised temperatures."

Then the patent proceeds to point out that the vapor pressure characteristics of butyl carbitol indicate the properties which a solvent should have in order to be substitutable.

The Court: Is that another name for this substance?

The Witness: Yes. That is another name for butyl carbitol.

Q. Now in view of what the patent says there, could an ordinary petroleum, such, for example, as kerosene or fuel oil or some of these petroleum products (58) that are commonly known on the market, be substituted for butyl carbitol? A. Not with satisfactory results at all. The first portions of the solvent would usually evaporate much too fast, causing the ink to dry on the rollers of the press, and the tails, as they are called, the last portions to evaporate would evaporate so slowly that the ink would be very hard to dry by heating.

Q. What is the characteristic vapor pressure of butyl carbitol that kerosene and fuel oil do not have? A. The fact that the vapor pressure is nearly constant during evaporation, which means that the rate of evaporation will be constant.

Q. That is not true of ordinary petroleum? A. That is not true of ordinary petroleum.

Q. In fact, your "kerosene" line on Plaintiff's Exhibit 13 for identification shows that, does it not? A. It shows that very strikingly.

Q. Now, is there any other characteristic which brings out that same difference in vapor pressure, that is, is there any other characteristic between kerosene, let us say, and butyl carbitol which is related to this failure to evaporate at a uniform rate? Is there any difference in the boiling ranges? Explain what a boiling range is. A. A boiling range is a characteristic which is related to vapor pressure in a certain way. Any (59) mixture of chemical compounds will usually have quite a wide boiling range, whereas a substance like butyl carbitol, which is almost a pure chemical compound, evaporates at a fixed temperature, nearly fixed temperature. Material like kerosene will start at a low point, say around 175 degrees centigrade, and may run up to as high as over 300 degrees centigrade; whereas butyl carbitol boils off completely in the distillation test within a range of about 10 or 15 degrees. The boiling range becomes a measure, then, of the vapor pressure.

Q. That is, kerosene has a very wide boiling range, as I understand it? A. It does.

Q. And butyl carbitol a very narrow boiling range? A. It has.

Q. And that is related to the vapor pressure of these substances in such a way that at some temperature, say below the boiling temperature, like 150, butyl carbitol has a constant vapor pressure as it evaporates and kerosene has a diminishing vapor pressure? A. That is correct.

Q. Now, if you were asked to find some kind of a petroleum product which could be substituted for butyl carbitol under the specifications of the patent, that is, which had vapor pressure characteristics of butyl carbitol, (60) could you do that? A. Yes, I could.

Q. What sort of petroleum product would you get? A. I would get one which had a very low vapor pressure at room temperature, as low or lower than butyl carbitol, which has a very rapid increase in vapor pressure up to a matter of centimeters at 150 degrees centigrade, and one which has a very narrow boiling range. The narrow boiling range would be necessary to assure a constant rate of evaporation.

Q. As I understand, the petroleum you are talking about is one with a very narrow boiling range and is very different from kerosene that you have mentioned before, for instance? A. Yes. It would be a boiling range in the neighborhood of 15 or 20 degrees centigrade.

Q. And what is the boiling range of kerosene? A. From around 175 up to over 300.

Q. I now direct your attention to the patent again, page 2, line 20 of the first column. You will see the formula of ink given by way of illustration. That ink contains a pigment, does it not? A. It does; chrome yellow.

Q. And it has a vehicle, has it not; that is, something to carry the ink? A. It does. The vehicle consists of——

Q. Excuse me just a minute. I would like to ask (61) whether the vehicle contains any solid? A. Yes; nitrocellulose.

Q. And it also contains some liquid, does it not? A. It contains three liquids: butyl carbitol, which is the solvent; dibutylphthalate and castor oil, which are used as plasticizers.

Q. Just what do you mean by a plasticizer, Mr. Bragdon? A. They are liquids of very low vapor pressure which are used as softeners or materials to make the film more flexible. They remain with the solid material preventing it from cracking or rubbing off too readily.

Q. They do not keep it from hardening but merely keep it from getting too brittle? A. That is the idea.

Q. Now the patent mentions two of those plasticizers. One of them is dibutylphthalate. Will you please look at the graph, Plaintiff's Exhibit 5 for identification, and tell

us what that shows about the vapor pressure of dibutyl phthalate. A. That shows that the vapor pressure of dibutylphthalate is very low even at 150 degrees centigrade, a matter of around a millimeter, which would mean a very slow evaporation rate even at that temperature, and in the very short time that the ink film is exposed to heat there would be practically no evaporation at all.

Q. The vapor pressure of that plasticizer dibutyl- (62) phthalate is not of the order of centimeters when you get up to 150, is it? A. It is not, no.

Q. Have you figured from that example given in the patent what proportion of the liquid component of the ink, that is, of the total liquid in the ink—what proportion of it is butyl carbitol? A. About 73 per cent.

The Court: Of what?

The Witness: Of the ink given in the specification of the patent.

The Court: Is that this (indicating)?

The Witness: Yes.

The Court: 73 per cent of that?

The Witness: That is right.

Q. That is, 73 per cent of the total amount of liquid in the ink consists of butyl carbitol? A. That is correct.

Q. And it is the butyl carbitol only, as I understand it, that has the vapor pressure in the order of centimeters when the ink is heated? A. That is correct.

Q. The other substances do not? A. That is correct.

Q. Now have you examined the samples of ink of the defendant's ink, which were produced by the defendant in answer to the interrogatories? A. I have.

Q. They were very small samples, were they not? A. They were very small, yes. They were so small that (63) it was impossible to do very much with them but you could see that they were of the consistency of an ordinary printing ink.

Mr. Free: I might explain, your Honor, at this time that it was not because of unwillingness to give them more. It was because those are the only samples we had left back in 1941.

Mr. Byerly: We have no criticism of that, your Honor.

The Court: Very well.

Mr. Free: But we will concede that the ink, when in proper shape, has the consistency of ordinary printing ink.

The Court: What interrogatory is that?

Mr. Byerly: An answer to Interrogatory 9 I think refers to the giving of the samples—or possibly Interrogatory 8. The answer is quite long. It first refers to giving a sample of the solvent and the inks and then gives some data as to their formulas on the next page.

The Court: Pigment is coloring matter?

The Witness: That is correct.

The Court: And what is resin?

The Witness: Resin is the binder, the solid binding material.

(64) Q. In view of Mr. Free's concession that these inks were of the proper consistency, ordinary consistency of a printing ink, from your examination of them can you say that the solids and liquids in them are of such proportions as to give the right consistency? A. I would say that they are.

Q. Did each ink consist of a pigment dispersed in a vehicle? A. They did. It was evidently so.

Q. Was the vehicle a viscous organic compound? A. It was evident from the samples and from the defendant's reply to the interrogatory that that was the case.

Mr. Free: Your Honor, I object to this line of questioning. Counsel is phrasing his questions in the language of the claim. It is all right to read

them on the patent but not the claim. That is the Judge's job to determine whether or not the claim fits the subject matter accused to infringe.

The Court: Objection sustained.

Mr. Byerly: I am a little puzzled, your Honor, because the patent and the claims describe the same ink, and I presume we have a right to bring it out.

The Court: It is a question of how you framed your question, not what you attempted to bring out, that the objection goes to.

Q. Did each of the defendant's inks contain a (65) solvent? A. According to the defendant's reply to the interrogatories they did. They supplied the formulas for the inks and the formula showed that in the two red inks that they supplied—I mean in the two blue inks that they supplied—the solvent consisted about 84 per cent of the total of the liquid ingredients.

The Court: Where is that?

The Witness: Here (indicating). The liquid ingredients consist of the solvent and this liquid here. This is about 84 per cent of the sum of those. The same with the Cudahy blue. The percentage of the total liquid ingredients—

The Court: Not of the total ink?

The Witness: Not of the total ink. In the two red inks the percentage is about 79 per cent.

In the yellow ink it is about 65 per cent.

In the black ink it is about 86 per cent.

Q. According to defendant's analysis and your examination of these inks, does each ink contain a binder? A. It does. The resin serves as a binder. It is possible that some of the ingredients mentioned as "other ingredients" also serve as binders.

Q. Is there resin in each ink, according to the defendant's analysis. A. There is. In the black ink there is, in

addition to the resin, gilsonite, which is (66) a black material having very much the appearance of a resin. There is some doubt in common trade terminology as to whether or not it should be called a resin, but it performs function of resin in this formula.

Q. The specific example of the patent refers to nitrocellulose, does it not? A. It does.

Q. How does the action of nitrocellulose and a resin compare in such inks? A. They behave in very much the same way. They act as binders. A resin may show a little more tendency to soften under heat than the nitrocellulose but that is not material to the behavior of the ink because usually the ink is cooled artificially immediately after the solvent is driven off by heat.

Q. Then in the case of both nitrocellulose and resin as the solid material, the ink is dry when the solvent is gone? A. That is correct.

Q. Defendant has stated that the solvent in all their inks is the same and it consists of ink oil 502C, is that right? A. That is correct.

Q. Did you examine the sample of this solvent which was furnished by the defendant? A. I did. I found that it had a very narrow boiling range and we determined the vapor pressure characteristics of it in our laboratories. The curve on Plaintiff's Exhibit 5 for identification marked "S and C 502C" shows the vapor pressure at (67) various temperatures of the defendant's solvent.

The Court: What exhibit is that?

The Witness: 5. That shows that the vapor pressure of S and C 502C at 20 degrees Centigrade is of the same order as butyl carbitol. The scale of the graph is not large enough to definitely show where it lies, and at 150 degrees Centigrade the vapor pressure is on the order of centimeters, or over a thousand times.

The Court: Is that 2 Centigrades?

The Witness: 2 centimeters.

Q. Now if this is so, how would the action of this defendant's ink or defendant's solvent 502C—supposing you heated the paper up to 150 degrees Centigrade after it was printed, how would the action of the ink compare with that of the inks which you demonstrated, that is, Exhibits 7 and 9? A. It would evaporate at just about the same rate, at 150 degrees Centigrade, as Exhibit 9.

Q. Exhibit 9 is the ink on the paper and that was the ink which we have marked Plaintiff's Exhibit 8. Now the vapor pressure of that ink I think you said was what? A. Of the solvent is 1½ centimeters, and this being 2 centimeters it would evaporate at about the same rate as that, a little faster than that.

Q. You say this graph, Plaintiff's Exhibit 5 for identi-
(68) fication, does not definitely show how low the vapor pressures are at room temperature. Have any measurements been made in your laboratories, or calculations made to determine whether or not the vapor pressure of 502C is as low as that of butyl carbitol at 20 degrees Centigrade? A. We have made such measurements in our laboratories.

Q. And what was the result? A. We find that the vapor pressure of 502C at 20 degrees Centigrade is as low or lower than butyl carbitol.

The Court: Are all these supposed to come together here (indicating)?

The Witness: Well, the scale of the graph is such that the lines appear to lie on top of each other. There is actually a slight difference between them.

Q. Defendant's interrogatories refer to their various inks as containing "other ingredients" which they do not specify. You found that to be so, did you not? A. I did.

Q. And they do state that some of these ingredients are liquid, do they not? A. They do.

Q. And then I think in the last paragraph of the answer to Interrogatory 9 there is some clue given as to the nature

of those liquids, is there not? A. I will refer to a copy of the interrogatories. (Examining.) They (69) state that "'the other ingredients' referred to above consist of linseed varnish and or perilla varnish, wax and/or grease, drier, and so forth."

The liquid ingredients would be the linseed and/or perilla varnish.

Q. And the formulas show that the amount of this is very much less than the amount of the solvent, do they not? A. Yes.

Q. What is the vapor pressure of these two varnishes mentioned at room temperature? A. It is almost zero. There is practically no evaporation at all from linseed or perilla varnish.

Q. Then in view of what you have said about the vapor pressure of solvent 502C at room temperature, would it be correct to say that the entire liquid part of these inks has a vapor pressure below that of butyl carbitol at room temperature? A. It would be.

Q. Now does this solvent 502C have the other characteristic of the vapor pressure of butyl carbitol to which you have referred? How does its vapor pressure behave while the solvent is evaporating? A. It remains nearly constant because it is a very narrow cut and consists of compounds very nearly identical.

Q. Can you point that out on Plaintiff's Exhibit 13 for identification? A. On this graph here, this lower (70) line represents the vapor pressure of defendant's solvent when various amounts had been evaporated. At 100 per cent it would be over here (indicating); at 90 per cent it is around 2 centimeters. It remains above 1 centimeter clear down to below 30 per cent residue.

Q. I understand the line stops at 30 because actual measurements in the laboratory were not made beyond that, is that correct? A. That is correct.

Q. But if on the basis of what is there, does it look to you as if this solvent would maintain a uniform rate of

evaporation until it is all gone? A. Very nearly uniform clear up to the end.

Q. And referring again to Plaintiff's Exhibit 13 in that respect it appears from that exhibit that it is like butyl carbitol and entirely different from petroleum, such as kerosene, is it not? A. That is correct.

Q. Did you ascertain the chemical composition of solvent 502C? A. In a general way we found that it is a petroleum hydrocarbon, consisting almost entirely of straight chain compounds, and in that respect it has some strong similarities to butyl carbitol, which is also a straight chain compound. It is almost a completely saturated hydrocarbon which gives it a similarity to butyl carbitol. It differs from the aromatic compounds which are ring structures and which usually introduce (71) high reactivity and strong odor.

Q. Referring again to these graphs, Exhibits 5 and 13, which have been marked for identification, are those graphs based on measurements made in your laboratories? A. They are.

Q. Take the graph, Exhibit 5. Did you check the measurements which you had made on butyl carbitol and on the defendant's solvents with the measurements which the defendant made in the presence of counsel? A. We did compare them and found that our measurements checked very closely with those made by the defendant.

Q. I notice on Plaintiff's Exhibit 5 for identification the two forms of dots, one marked "Taylor Exhibit W" and one marked "Taylor Exhibit U". A. Those are the data shown in the defendant's tests on these same materials.

The Court: You took their test and put it on here?

The Witness: We drew the lines from data that we obtained. The actual points are not shown, but the points that are shown are the defendant's data.

Q. They fall very close to your lines, do they not? A. They fall very close to our lines.

The Court: Is this a good place to adjourn?

Mr. Byerly: Yes, but I should first like to offer these two in evidence before we adjourn.

(72) The Court: All right.

Mr. Byerly: I will now offer the graphs previously marked for identification as Exhibits 5 and 13.

The Court: Any objection?

Mr. Free: No objection, your Honor.

The Court: Admitted in evidence.

(Plaintiff's Exhibits 5 and 13 for identification received in evidence.)

The Court: The court will adjourn until two o'clock.

(Recess until 2:00 P. M.)

---

(73) AFTERNOON SESSION.

CHARLES R. BRAGDON, resumed the stand.

Direct examination continued by Mr. Byerly:

Q. Are the resins and solid matter contained in the defendant's inks soluble in the solvent 502C, which is used in this ink? A. I assume that they are, because if they were not, you would not get a suitably smooth printing ink.

Q. And on the basis of Mr. Free's admission that the inks have the proper consistency, does that indicate to you that the resins are dissolved in the solvent? A. It does show it; otherwise the inks would give a very rough and unsuitable film.

Q. Can you tell by the samples of the defendant's inks which you have examined, whether the solution of the

resins used by the defendants in the solvent which they use, is a stable solution? A. I would say that it must be, because these samples purport to have been standing for a number of months and they show no evidence of any instability.

Q. Is the solution made by dissolving these resins in this solvent viscous? A. It would be naturally quite viscous.

The Court: You mean sticky?

The Witness: Thick, like molasses.

(74) Mr. Byerly: That is all. You can cross-examine.

Cross examination by Mr. Free:

Q. Mr. Bragdon, is it fair to say that this ink we are talking about is like the old linseed varnish inks in every respect except that the linseed varnish has substituted for it a resin dissolved in this high boiling solvent? A. Well, I think that would be fair.

The Court: What are you talking about, the plaintiff's or defendant's ink, or this whole class?

Mr. Free: This whole class, your Honor.

Q. The pigments are the same as they always have been? A. The same as they always have been.

Q. The print from the same type? They print from the same type as they always did? A. That is correct.

Q. On the same presses? A. The same presses, plus heating equipment.

Q. The same paper? A. The same paper can be used.

Q. When you substitute the resin dissolved in the solvent for the old linseed varnish, you make it about as thick as the old varnish, don't you? A. You do.

Q. So then we have this as a description of the new ink, that the only change is the substitution of a resin dissolved in a high boiling solvent for the old linseed varnish, is that right? A. Resin dissolved in a solvent (75) of the vapor pressure characteristics of butyl carbitol.

Q. As I understand it, in reference to Plaintiff's Exhibit 5, the defendant's solvent 502C oil there shown has a vapor pressure at 150° of about 20 millimeters, according to the curve, is that what you make it? A. The defendant's solvent is approximately 20 millimeters, or 2 centimeters.

Q. And that, as I understand it, is a high boiling petroleum fraction. We are all agreed on that, aren't we? A. We are.

The Court: Petroleum what?

Mr. Free: Petroleum fraction.

Q. In reference to Plaintiff's Exhibit 13, you cut off 10 per cent of the 502C oil before you measured it, did you not? A. Yes.

Q. You understand that that part you measured was ten per cent less than what was given to you and is not what we use in our ink, do you not? A. Well, it corresponds in the same manner to the butyl carbitol.

Q. That is, what you measured on this curve, Plaintiff's Exhibit 13, was 90 per cent of our solvent and not 100 per cent? A. That is correct.

Q. If you had measured 100 per cent as it was given to you, the curve would have been a little steeper at the beginning, would it not? A. A little.

(76) Q. And the boiling range, therefore, would not be as narrow as you have shown it on Plaintiff's Exhibit 13, is that right? A. Not quite as narrow.

Q. That is also true of butyl carbitol as shown on Plaintiff's Exhibit 13, is it not? A. That is true.

Q. What is the boiling range of butyl carbitol as it comes from the manufacturer? A. It is about between 10 and 15 degrees centigrade.

Q. In your previous testimony given in 1938, which you will remember, you were asked this question:

"What is the boiling range of butyl carbitol? A. The extreme boiling range is about 28 degrees."

Is that in accordance with your recollection? A. I think it is about correct, yes.

Q. That is commercial butyl carbitol? A. That is commercial butyl carbitol.

Q. And that is what you use in your inks, a commercial butyl carbitol? A. That is correct.

Q. A commercial butyl carbitol is what Brewer and Gardner predicated their vapor pressure points on too, did they not? A. I believe it was commercial butyl carbitol.

Q. Did you tell us what the boiling range of defendant's 502C oil is? A. I think I have it here. I do not have the boiling range in mind.

The Court: What is the boiling range of butyl (77) carbitol?

The Witness: It is from about 215 to about 233 Centigrade.

Q. Have you had occasion to examine defendant's 502C oil fairly closely? A. Fairly closely, yes.

Q. You know what it is, do you not? A. Yes, I know that it is a petroleum distillate.

Q. Do you know what source it comes from? A. It comes from the parafinnic type of petroleum.

Q. Commonly known as the kerosene series? A. It could be considered roughly in the kerosene family.

Q. That is, the upper range of the kerosene family? A. Yes, I would say it is about in that range.

Q. We have heard a lot about boiling ranges this morning. Is there anything, any reference in the patent at all, to boiling range? A. I do not recall any. I do not find any.

Q. Do you happen to know what the vapor pressure of ordinary water is at room temperature, say 20 degrees Centigrade? A. It is about 1½ centimeters.

Q. About 15 millimeters? A. That is correct.

Q. The vapor pressure of alcohol, according to this patent, is about 40 millimeters at 20 degrees Centigrade? A. That is correct.

Q. Would you call water and alcohol similar or dis-
(78) similar insofar as vapor pressures are concerned? A. I would say they are in about the same class. They would evaporate at about the same rate when exposed in an open vessel.

Q. Yet the vapor pressure of alcohol is more than twice as much as that of water at 20 degrees centigrade, is it not? A. That is right.

Q. You say the evaporation rate is about the same, nevertheless? A. About the same, yes.

Q. Alcohol evaporates faster than water at room temperature, does it not? A. It does.

Q. And that is because of the difference between their vapor pressures at room temperature? A. That is true.

Q. Is this a fair statement, that vapor pressure and boiling point are related to each other? A. They are.

Q. The higher the vapor pressure of a given substance the lower its boiling point? A. As a general rule.

Q. And the converse is true also? A. Yes, as a general rule.

Q. Will you take a look at your patent, please, particularly on page 2, column 1, line 49, where butyl carbitol is described as a chemical compound of carbon, hydrogen and oxygen, and tell me whether that description fits a high boiling petroleum solvent like 502C oil? A. It does not fit, in that petroleum hydrocarbon is merely carbon
(79) and hydrogen. In other respects it would fit fairly well, except that 502C is a mixture of compounds rather than a single compound.

Q. Just what do you mean by a mixture of compounds, what compounds? A. Well, it is a mixture perhaps of a hydrocarbon with say, 12 carbon atoms and 26 hydrogen atoms, and one with 13 carbon atoms and 28 hydrogen

atoms, and so on. There may be several of that series present in the 502C.

Q. I have a note here that according to the boiling range of defendant's 502C oil, it contains apparently some tetradecane and some hexadecane and some pentadecane, those being the carbo-hydrogen compounds you had in mind, isn't that right? A. That is correct.

Q. One boils at 252 centigrade, another at 270 centigrade, and another at 287, is that in accordance with your understanding of those compounds? A. It is substantially the way they would run.

Q. Referring again to the patent in suit, I have read it over pretty carefully and the only solvent that I find mentioned there having the vapor pressure characteristics described, is this diethylene glycol monobutyl ether, did you find that to be the case also? A. The patent says that any solvent may be used which has a vapor pressure as low as that of butyl carbitol at 20 degrees centigrade, (80) and approximately as high as that of alcohol at 150 degrees centigrade.

Q. And that is about 40 millimeters at 150 degrees centigrade? A. In that general range, yes.

Q. But the only substance you find mentioned in the patent that conforms to those requirements is butyl carbitol, is it not? A. That is so.

Q. There is no mention of high boiling petroleum fractions or anything like that, is there? A. I do not find any.

Q. Down at the bottom of page 1 of the patent, second column, line 53, it is stated:

> "Among this peculiar class of solvents I have found as an example" this butyl carbitol.

What is peculiar about that class? A. That is the class having the vapor pressure characteristics which I described this morning, that is, having a very low vapor pressure at room temperature, a vapor pressure which increases very

rapidly at temperatures about 100 degrees centigrade, and which have a nearly constant vapor pressure during evaporation.

Q. Do you know any solvent which might be used here which is different from that, having the boiling point around the boiling point of butyl carbitol? A. There are a great many organic compounds which would lie fairly (81) close to that description.

Q. Just as peculiar in that sense as butyl carbitol? A. They would fall outside the class, usually in either being higher than butyl carbitol at 20 degrees centigrade or in being too low at the other end.

Q. That is, you would not find one that would fit exactly? A. Not very many. You would find a few that would be in that general class, that would fit that description.

Q. But those that fit exactly would be the same in the sense of this peculiar action? A. Yes.

Q. How close would you have to come to this curve of butyl carbitol to retain this peculiarity you have referred to?

Mr. Byerly: I object to that.

A. A reasonable distance, I would say. For instance, the solvents which would lie, as illustrated by the experiments I ran this morning, perhaps from about 1½ centimeters to 6 centimeters at 150, and a few hundredths of a millimeter at 20.

Q. So anything which would do the job between 1½ centimeters to 60 at 150 degrees centigrade, would be in that class in your opinion? A. Around 1½ to 6 centimeters.

Q. I show you a set of curves which have drawn on them (82) a curve B, marked "butyl carbitol," and ask you to pick out solvents on that set of curves coming within the specifications you have just mentioned? A. There are none here that lie very close to that curve.

Q. Do you find one there which lies between 1½ and 6 at 150 degrees centigrade? Those two? A. There is 150 degrees here. Those are much lower than butyl carbitol, at 150 degrees centigrade.

Q. Are they lower than 1½ centimeters at 150 degrees? A. I cannot see by this chart. I think they would be lower.

Q. 1½ centimeters would be pretty close to that base line? A. It would be.

Q. And those two curves which are marked "ethyl ether of triethylene glycol" and "diethylene glycol", are above that base curve, are they not? A. Above the base line.

Q. At least 1½ centimeters above it? A. I don't think they would be. They would be pretty close to the 1½ centimeters.

Q. I show you another set of curves which are straight lines instead of curves, and therefore more readable, and ask you to pick out of that chart any solvents you find which come within the description you mentioned, that is, solvents having a vapor pressure at 150° C. between 1½ and 6 centimeters.

(83) Mr. Byerly: I object to that question because in the class mentioned by the witness he gave a limit to the vapor pressure both at the start, and also specified what the vapor pressure must be at 20. I think it is an unfair statement of the class of solvents to which he referred to refer to the limit only at one end. I have no objection to his answering a question as to that limit, but that is not the class to which he refers.

The Court: You can bring that out on redirect, if you wish. It is not very clear.

A. According to this chart the vapor pressures of diethylene glycol and of the ethyl ether of triethylene glycol both lie slightly above 1½ centimeters at 150 degrees centigrade.

Q. Will you tell me whether those solvents satisfy the

requirements that you mentioned at 20 degrees centigrade? A. They would be as low or lower than butyl carbitol.

Mr. Free: I offer in evidence the set of curves just referred to by the witness.

Mr. Byerly: I object to the exhibit as entirely unproved.

The Court: I think that objection is good, Mr. Free.

Mr. Free: I will ask to have it marked for (84) identification.

(Marked Defendant's Exhibit A for identification.)

Q. Still referring to this peculiar class of solvents we have been talking about, it is a fact, isn't it, that any of these solvents you mentioned will evaporate if heated high enough? A. They will. In some cases you have to heat them very high.

Q. Did you have occasion to notice the odor of defendant's 502C oil? A. I did.

Q. It has quite an odor? A. I would say a very mild odor.

Q. Sort of a kerosene smell? A. Slightly resembling kerosene.

Q. You would not call it odorless? A. No, not entirely.

Q. Or colorless? A. No.

Q. It has a straw color, hasn't it? A. A very light straw color.

Q. In that respect the presence of the odor in the 502C oil makes it differ from butyl carbitol as described in the first column of page 2 of the patent, does it not? A. Reading from line 49, page 2, column 1:

"Diethylene glycol monobutyl ether is a practically odorless, saturated," etc.

It has a slight odor also.

Mr. Free: That is all.

(85) *Re-direct examination by Mr. Byerly:*

Q. You have referred to the fact that the curves on Exhibit 13 are started after ten per cent of the material is evaporated, and I think you said that was to get rid of volatile impurities that the substances might contain? A. They may contain dissolved gases, some water, and, for instance, butyl carbitol may contain traces of butyl alcohol.

The Court: Do those go off first?

The Witness: They go off first.

The Court: Waiting until ten per cent has gone off, you get a better product to start with?

The Witness: That is correct.

Q. In your Exhibit 5 in which you gave vapor pressure curves at different temperatures in getting those points did you proceed in the same way as making Exhibit 13, that is, did you let ten per cent go off before the measurements in order to get correct results? A. We did.

Q. And these results you have already said that you obtained, checked with the measurements made by the defendant? A. They did.

Q. From which I assume it is customary to remove a little to get rid of the volatile impurities before making vapor pressures? A. That is correct. By the method used by the defendant for measuring vapor pressures you would (86) always lose a small amount of the solvent before you would get your reading.

Mr. Byerly: That is all.

Re-cross examination by Mr. Free:

Q. Just to make it clear, you do not take off the first ten per cent of butyl carbitol before you put it in the ink, do you? A. No, we do not.

Q. As far as you know, the defendant does not do that to his 5020 oil either? A. No.

Q. You use it as it comes from the manufacturer? A. We do.

Q. Which is reasonably pure? A. Commercially pure.

Q. Pure enough for an ink? A. Pure enough for an ink, yes.

Q. As a matter of fact, an ink contains lots of impurities in addition to that? A. It probably does contain some other impurities, yes.

Q. Resins contain impurities? A. They do.

Q. Pigments contain impurities? A. Yes.

Q. Plasticizers do? A. Yes.

Q. Everything does? A. Most things do.

Re-direct examination by Mr. Byerly:

Q. Did you notice whether the presence of these small amounts of impurities in butyl carbitol or any other ink solvents, have an effect on the ink on the rollers of (87) the press? A. Very little effect. Those volatile impurities probably do come off largely during the time that the ink is making its way from the fountain to the type.

Q. Is there enough of them to make any change in the consistency of the ink? A. There is not enough of them to make any appreciable difference in consistency.

The Court: Are these inks all used with the series of rollers that you described this morning?

The Witness: They are in practically all regular printing installations.

The Court: Is that 18 different rollers it passes over?

The Witness: Yes.

Frank W. Cray, for Plaintiff—Direct.

FRANK W. CRAY, called as a witness on behalf of the plaintiff, being first duly sworn, testified as follows:

Direct examination by Mr. Byerly:

Q. What is your occupation? A. Vice-president of Eastern Division, International Printing Ink Corporation.

(Answer read.)

The Witness: I will change that. I am Divisional Vice-President of the International Printing Ink Division of Interchemical Corporation.

(88) Q. At any rate, you are employed by the plaintiff? A. That is right.

Q. How long have you been in the employ of the plaintiff, Mr. Cray? A. Since the early part of 1935.

Q. How long have you been in the printing ink business? A. Since 1905.

Q. Did you have your own printing company for part of that period? A. From 1917 or 1918 to 1935.

Q. What was the name of your company? A. Cray-Finne Corporation.

Q. In the course of your forty years' experience in ink making have you learned how to compound inks, the art as we might say, of mixing things together to make inks? A. I imagine so, yes.

Q. Have you learned how to adjust the consistency or body or weight of an ink to the particular printing press and particular type of paper with which it is to be used? A. Yes, I think that has been the custom since almost the beginning of time, and particularly more so now with the coming of high speed presses.

Q. How do you do that, Mr. Cray, how do you get the ink the right consistency for a particular job? A. By using the right body or varnish, I should say.

Q. You use a number of different varnishes, as you call them, do you? A. Yes, eight or ten, twelve or (89) fifteen—probably fifteen different bodies.

Q. At the time you had your own company, those varnishes were different sorts of linseed oil? A. Mostly linseed, with very little china wood oil, and what we call a mineral oil varnish, which was a resin, plus an ordinary mineral.

Q. And those varnishes all had different bodies, as you call them? A. Yes.

Q. That means they were different thicknesses? A. Different consistencies or thicknesses.

Q. When you wanted an ink of a particular consistency for a particular job, what did you do, mix certain of those together? A. Sometimes you would make an ink out of two and other times you might use five or six of the different varnishes to compound an ink.

Q. And that adjusting of inks to the particular sort of press and paper, has that gone on ever since you have been in the printing business forty years? A. It certainly has.

Q. And they are doing it now? A. I will say they do.

The Court: For different jobs you use different inks.

The Witness: Yes, and for different types of equipment, for different types of presses. You use different inks.

(90) The Court: The Illustrated Weekly is printed with one type of ink and a newspaper is printed with another, and commercial printing is another type of ink?

The Witness: Yes, it might be quite different, depending on the speed of the press and the type of paper. The type of paper is usually the most important factor that determines the type of ink you are going to use on it, and then the question of the speed of the press is a very important factor, too. For instance, if you are running on a highly coated paper that has a delicate surface, you cannot have

much tack or pull in that ink or it will pick the paper as it goes through the press.

Q. Does the speed of the ink rollers of the press make a difference in the body of the ink you ought to use? A. Yes, I would say that was another factor that enters in. For instance, on these new type high speed job presses with small rollers, those rollers make a great many more revolutions in a given period than the larger sized rollers do. Consequently, unless you have your pigment and vehicle perfectly bound together, sometimes these fast running job presses will throw that ink off and throw it all over the room, not only put it on the paper but throw it all over the place.

Q. So that you do have to consider the kind of press to get the consistency, body and everything right? (91) A. I think you do. That is a factor.

Q. Since you have been with the plaintiff have you taken part in the selling of the plaintiff's heat set inks? A. I certainly have.

Q. What name are those inks sold under? A. Vaporin.

Q. Have you been in some of the printing establishments where these inks have been used? A. Yes, most of them.

The Court: Is the name Vaporin a trade name?

The Witness: Yes, V-a-p-o-r-i-n.

Mr. Byerly: Can your Honor see that diagram?

The Court: Yes.

Q. I have just placed an enlarged diagram of a printing press before you. Are you familiar with this type of press? A. Yes, I am.

Q. Have you seen this press used with the plaintiff's "Vaporin" inks? A. Yes, I have seen a number of them used in different places, of that type.

Q. Will you explain how that press works, particularly how the paper and how the ink goes through the press, so that the Court can understand the operation of this ma-

chine? A. I guess I can describe it. This would be what is known as a two-web, two-color perfecting press. You can run two separate webs through this machine at the same time, and you can put either one or two colors on both sides of each (92) web. This represents the paper roll and here is your first printing unit. This is the impression cylinder, and these are what we call the color cylinders, or the printing cylinders. These two cylinders are the—

The Court: What do you mean by web?

The Witness: The paper. After it is printed here, for instance, it moves on through this heating unit. This is a gas heating unit, which probably gets a temperature up to 1500 degrees Fahrenheit. This web, understand, is traveling at a speed of anywheres from 750 to 1000 linear feet per minute. After it goes through the heating unit it immediately passes over these two 10-inch cooling rollers. Then the web is reversed and comes down through these angle rollers and is printed on the opposite side. Here in this instance is the impression cylinder and here are the printing cylinders. She then passes through the second heating unit and over the second set of cooling rollers and then up in and in case this upper deck is running it joins that web and goes down into the folders and creasers. This apparatus here sheets it and folds it into 16-page signatures. The best way to describe that is a 16-page book and all cut and folded. There would be on this press four of those 16-page books running at one time, or, in other words, this is what is known as a 96-page perfecting press.

(93) Q. Will you show how the ink goes on these things that you have called the printing cylinders? The printing cylinder, as I understand it, is the thing that carries the type on it, or the raised plates from which the printing is done? A. Yes.

Q. Will you point out how the ink gets into the printing cylinders? A. This side elevation does not show that too good. However, this represents the fountain, I presume.

Q. How about the diagram here? A. Here is your fountain. Here is your fountain roller, and here is your ductor rollers. Then it comes over here to a set of angles or distributors.

The Court: You have got the ink on the very last.

The Witness: Yes, there is the ink, and this causes that, and then this helps break it down, that is, break it up. Then this comes over and you have a motion here like that (illustrating). That feeds these rollers. These are what you call distributors, or the rollers that are used to break up the ink into a fine film. Then it is passed on to these rollers here, known as your form rollers, which come into direct contact with the printing cylinders. That is what prints. That is what has the type.

(94) Q. These rollers, which are marked R, oscillate, that is, move so as to pick up a little ink on one side and move it over to the roller on the other side? A. They oscillate and move back and forth their ink supply, pick their ink supply up from the fountain roller.

Q. Do any of these rollers have an end-wise movement as they turn around? A. Yes, they move both ways. That is to help break down the film.

Q. In the uppermost picture on the diagram these ink fountain and ink rollers are shown, are they not, in connection— A. That is right. That is the roller unit, the distributing unit for each cylinder. Each cylinder has its own distributing unit.

Q. That is because it prints in a different color? A. Yes, this probably would be one color and that another one.

Q. Have you seen the plaintiff's "Vaporin" ink in use on this sort of a press? A. Sure, many times.

Q. How does the ink behave in traveling from the fountain through all these rollers to the plate cylinder? A. It has to remain stable or you would be in printing troubles.

Q. Well, does it remain stable? A. It does remain stable, surely.

Q. Then what happens to the ink after it gets on the (95) paper and the paper goes through these heaters? A. It immediately is vaporized. These heaters are only about four feet and a half long, so you can figure out how short a space of time it is all through when that web is traveling 750 feet a minute. It is closed partially. There is just about that much space in there for this web to travel. That is about two inches, I would say, wide. The heating units themselves come down within an inch of the paper, or an inch and a half, and as that press is stopped those heaters turn away. In some instances they have radiant type caps on. Some have a ribbon type burner on. In the case of a ribbon type burner the length of that flame is synchronized to the speed of the press. This type is radiant heat entirely. They are 2-inch caps, but the most modern equipment now is this ribbon type burner, and that is controlled. If the press is running, we will say, 700 feet a minute, that would probably be four inches long, but as the press slows down, the flame shortens up, and consequently we save much more paper than we do in presses of this type. We lost quite a lot of paper that way in that interval it takes to turn the burners on and off, when the press is running at 700 feet, even though this turning off operation may only take ten seconds. You have got a lot of paper through there in that time.

(96) Q. If I understand you correctly, when the press is actually running each piece of paper along this web stays in the heater for a very short time? A. For a very short time.

Q. A matter of seconds. A. A very small fraction of a second. I would say that you get anywhere from 250 to 275 degrees Fahrenheit on the web itself, but that is im-

mediately dropped down again by these two coolers which they pass over. That ink when it comes out of there it is hot and the paper is hot, but immediately goes over the coolers and the paper goes back to room temperature again.

Q. When the web gets to this point here on the heaters and cooling rollers, if you put your finger on it, would that ink rub on there? A. That is dry.

Q. So it is entirely dry by the time you print on the other side of the paper? A. Absolutely.

Q. And as the ink is placed on the second side of the paper, then it becomes perfectly dry when the paper passes through the second heater here? A. In order to go through this folding mechanism.

Q. That is, the folding mechanism would cause smearing and blotting if the ink were not dry on both sides of the paper? A. That is right.

Mr. Byerly: I offer this chart in evidence.

(97) (Marked Plaintiff's Exhibit 14.)

Q. Mr. Cray, when did you first see a press running with an ink that stayed soft and stable on the ink rollers and then dried immediately when the paper was heated after it had been printed? A. In May 1932.

Q. Where did you see a press running with such an ink? A. Paterson Parchment Paper Company.

Q. Where is the plant, or where was the plant of the Paterson Parchment Paper Company? A. It was at that time located in Passaic, New Jersey.

The Court: What was it he first saw?

Mr. Byerly: He first saw an ink which stayed soft on the rollers of the press and dried instantly by heat.

Q. What was the business of the Paterson Parchment Paper Company? A. Well, they made this special parchment paper which is used mainly for wrapping foodstuffs,

like butter was their chief thing. Ham, cheese, sausages and things of that kind, used almost exclusively for wrapping foodstuffs.

Q. Did they print this parchment paper after they made it; did they print labels and things on it? A. They did.

Q. Were they customers of your ink company, the Cray-Finne Company? A. They were for many years.

(98) Q. It was in 1932 you saw this, you say? A. Yes.

Q. About that time did your company do any business with a company called Zinsser & Company? A. That is right, we did.

Q. What was their business? A. They manufactured dry colors mainly; at least that is what we bought from them.

Q. Were you acquainted with their chief chemist? A. Yes.

Q. What was his name? A. Dr. Gessler.

Q. I want you to tell us how you came to see this ink in 1932 running on a press, that stayed soft on the press and dried instantly by heat. In the first place, was that an ink which you yourself had brought over to the Paterson Parchment Paper Company, I mean they got the ink from you? A. That is right. Well, there was quite a little of it before 1932.

Q. Just tell us how you happened to get hold of an ink like that? A. We were looking for an odorless ink and had been for years, and we finally tried everything in the vegetable oil field, and got into the lacquer field, and we did not make any too much progress. In 1930 I met a salesman from the Zinsser Company, who called on us as a general thing, and he told me about a new development of dispersing color in blown castor oil and dibutyl ethyl (99) that Dr. Gessler was working on, and it occurred to me that that might be a lead for these odorless inks. I arranged for a meeting with Dr. Gessler. He came down to New York and we had lunch and discussed the problem. He gave us many samples, probably ten samples, of these dispersed inks. We

did a considerable amount of work from the early part of 1930 up into September or October of that year, and finally gave it up as a pretty hopeless task, because we found that if we got an ink that would dry on the paper it would also dry on the press and if we got an ink that would stay open on the press it would not dry on the paper. So there was a fine balance somewheres, but we could not seem to hit it, and after seven or eight months of trial and error method, we came to the conclusion that we just could not do much with that type of ink. We laid it aside and forgot it for probably the best part of a year.

(100) The Paterson Parchment Paper Company had seen samples of this ink and were very much interested in it because of its absolute lack of odor. We had an odorless ink, which was something we had been looking for for many, many years, and have kept—continued to put pressure on me in spite of the fact that I admitted we were licked. I couldn't get rid of them. They kept right on top of us, and finally, in the end of 1931, about the end of 1931, I got a hold of Dr. Gessler again and said, "We have got to do something about this situation out there."

In the meantime, I had given a lot of thought to why we failed, and I also gave a lot of thought to the type of presses that the Paterson Parchment Paper Company were using, and knowing how they dried lacquers I wondered if there would be any possible chance of doing something along that line. So I got hold of Dr. Gessler, and I discussed that point with him. I said, "Could you make me an ink that would be dry after being printed? We can put it over some kind of a heating device." He said, "Yes, I think we could." He said, "In fact, one of those inks I made for you in the beginning would do that."

Well he did not have his notebook with him, and I said, "Well, I would like to know which one of those samples would do that", and he went back to Hastings, (101) where his company was located, and called me back, I think the next morning, and pointed out one of these inks. At that time

we had very very small samples left, and they had deteriorated to a point where they were pretty hard, and I suggested to him that he make some larger samples.

In February of that year, 1932, he sent me these first samples, and following out some instructions which he gave me, I was able to make a print of that and pass that print over a hot plate and dry the ink. From there on we went to work. We had considerable work, and I had to go out to the Paterson Parchment—well, we had considerable work to do with formulating. Then there was a change to be made—changing the Paterson Parchment Paper Company, selling them the idea that there be a change from those two drums which were filled with brine for cooling purposes, change one of those over and let me put superheated steam in there so that we could try out these experiments. Well, along in May of that year, the first part of May, we finally had an ink that we thought could do this job, and we had reconverted that press over so that we used one of these big 60-inch drums for steam. We put steam in, and after our web was printed we ran it over, and we used the other one for the cooling unit, and one into a rewind, and that (102) is the first time that I ever saw an ink printed and dried instantly. I think that was in the early part of May, 1932.

Q. Now you say it went into a rewind. I take it this press out at the Paterson place was somewhat different from the large press you have considered here in connection with Plaintiff's Exhibit 14? A. Yes. It only printed on one side of the paper. For instance, if it was a three-colored paper it printed all three colors, all on one side of the paper.

Q. And the paper went by just one, or several of these printing units to get the colors? A. Three.

Q. Then it went right around a steam-heated drum, or a drum in which you put steam? A. That is right.

Q. Then was it rolled up again, or rewound? A. It went into a rewind.

Q. That is, rolled up tight on a drum? A. Rolled up tight; yes, sir.

Q. Did you find that this ink was so dry that it did not blot off, come off on the back of the web when it went into this type of rewind? A. Yes; absolutely dry.

Q. Now had the Paterson Company previously used this same press with ordinary linseed oil inks? A. Yes.

Q. Did those inks dry as soon as they were printed? A. No, they did not. They were oxidizing inks.

(103) Q. How could they run them into this rewind without their coming off on the back of the web? A. They did it by using what is known as a wax eliminator; that is, after they printed the three colors, one, two or three colors on, they put a film, a coat of hot paraffin wax right on top of the inks, and then that sheet rolled over these two brine rollers which were cold, of course, and that chilled the wax and kept it from sticking when it went into the rewind.

Q. I see. So that they had to have a layer of wax— A. That is right.

Q. —to keep the ink while it was still wet from sticking to the other side of the paper? A. That is right.

Q. And that is why they had these brine rollers on there to chill the wax? A. Yes.

Q. When you started using this new ink that you brought out you put steam in those instead of cooling? A. Put steam in one of them, in one of the cylinders.

Q. You say that that was the first time you had ever seen ink that stayed soft on the rollers and then was dried instantly on the papers? A. The first time.

Q. Did the people out at the press there, the Paterson Parchment Paper Company, express any particular interest in this ink? A. Well, they were all very (104) enthusiastic, of course. They had an odorless ink, and started out looking for an odorless ink, and then wound up with an odorless ink plus one that would dry instantly.

Q. Did you know a man out there named O. P. Smith? A. Yes, sir.

Q. He was connected with the Paterson Parchment Paper Company? A. Yes, sir; superintendent of printing department.

Q. Did you make any contact with the Curtis Publishing Company, that publishes the Saturday Evening Post, after you had run this ink successfully and dried it, out there at the Paterson plant? A. No, I don't think that is quite straight. O. P. Smith evidently told the Curtis Company what we were doing at his place, and the Curtis Company then contacted me. I think that is the way, as I remember it.

Q. What individuals from the Curtis Company contacted you, do you remember? A. Mr. MacGregor and Mr. Trayser.

Q. Did they come over to see you in New York? A. Well, they asked Mr. Smith if he would arrange for us to show them this new miracle ink, and Mr. Smith asked us if we would make up a black of the type that would commonly be used in magazines, such as the Saturday Evening (105) Post, and I don't remember whether Mr. Smith or they got a roll of paper which would be somewhat comparable to magazine paper. All that we agreed to do, we made a black, and then we made arrangements for—Mr. Smith set a date for the test run——

Q. Let me interrupt you there, Mr. Cray. What color was the ink which you first printed at Paterson, and which dried? A. Yellow, chrome yellow.

Q. Do you recognize this print which I now show you (handing to witness)? A. Yes.

Q. What is that, Mr. Cray? A. That is the first heat-dried ink I ever saw.

Mr. Byerly: I will offer that in evidence as Plaintiff's Exhibit 15.

(Marked Plaintiff's Exhibit 15.)

Q. Did you know a Mr. Dufford out there at the Paterson plant? A. Yes, sir.

Q. What was his position there? A. Chief chemist.

Q. I notice on this print, Plaintiff's Exhibit 15, the words "All 2 sec." Do you know who wrote that, and what it means? A. I imagine——

The Court: Well, don't imagine.

A. No, I don't know what it is.

Mr. Free: If your Honor please, this is all very interesting, but I do not see the materiality or (106) relevancy of it on the plaintiff's prima facie case.

Mr. Byerly: I think some of this might properly go in on rebuttal, but in order to avoid recalling this witness I thought I would let him tell his whole story.

The Court: Very well.

By Mr. Byerly:

Q. Now I show you a memorandum. Can you recognize that (handing to witness)? A. Yes, I do. That is Dr. Dufford's memorandum.

Q. Is that in Dr. Dufford's handwriting? A. It is.

Q. It says "Printing—New Ink Speed 132 feet per minute.

"Drum contact total 3 seconds. 25 pounds pressure, 237° Fahrenheit."

Do you recognize those notes as relating to that first test? A. That was the condition under which the first test was made.

Q. And what is the date of that memorandum? A. May 10, 1932.

Mr. Byerly: I will offer that in evidence.

Mr. Free: I think it is incompetent, your Honor, somebody else's notes, and he does not seem to know anything about them.

The Court: I do not think they have been properly identified yet.

(107) Mr. Byerly: I will mark them for identification, your Honor, and will call the witness who wrote them, if it becomes material.

(Marked Plaintiff's Exhibit 16 for identification.)

Q. Now, Mr. Cray, I interrupted you when you were telling of making up a black ink which would be more like magazine printing ink, for a test for the Curtis Company people. A. Yes.

Q. I think that was just at the point where you said you made this black ink; is that right? A. Yes. We made a black ink up, and Mr. Smith made arrangements for the press trial, and I met Mr. Trayser and Mr. MacGregor in New York and drove them out to Passaic, where we were to run this test for them. It was a black ink run on the same press, on paper that was comparable, or sulphide sheet that was comparable to what they were using in the Saturday Evening Post at the time.

Q. Did the ink stay moist on the rollers when placed to press? A. It did, and dried on the paper.

Q. Dried instantly on the paper? A. Yes.

Q. Did it run in a tight roll, the way you described? A. Yes.

Q. Was there any blotting or offsetting? A. No sign of offsetting whatever.

Q. Did the representatives of the Curtis Company, (108) Mr. MacGregor and Mr. Trayser, show any interest in its development? A. Yes.

Mr. Frees: I do not think he is competent to answer that question.

The Court: I do not think he can tell what their opinion was of it. He may say anything they said.

Mr. Byerly: That is all I want, anything they

said or did, just to get their reactions so far as the witness is concerned.

The Court: Well, if he had any further negotiations with them he may tell about that. What their emotions were or expressions were would hardly be for him to say.

Q. Tell us what they did. A. Well they invited me to come over and go to work in their press room, and I think they probably were over in Passaic along in September, because as I remember it took us about a month to get ready to make these tests in Philadelphia. In addition to that, they had one particular press that they wanted available for these experiments, and we had to wait until they got finished with their run on that; so about a month elapsed before our first experimental run at the Curtis Publishing Company in Philadelphia. That, I think, took place in the early part of November, 1932. We were given a press to work on, which was one of about 75 of their (109) standard machines. This is known as a six-color press. It prints one or two colors on the first side, and four colors on the second side. They had been conducting their ozone operations on this particular press, and had a small steam drum of about 16 inches on it, which they had used in their ozone tests. That is all we had the first day. So it was obvious from the beginning that we could not run full speed with a small drum, but we did run enough in the first couple of tests to indicate that we could dry this ink on that type of equipment, but we could not run full speed without increasing our heating area.

The Court: Did the speed depend upon your ability to heat?

The Witness: Yes. We only had a small 16-inch drum and you had to get a pretty good wrapper on that, and if you wanted to dry at faster speed you would simply have to increase the size of the drum.

Q. But you did succeed in demonstrating that heating the paper would dry the ink? A. Without any doubt.

Q. Do you remember what you printed over there at that first test of Curtis? A. Yes, I do.

Q. (Hands paper to witness.) A. That is the job. That is part of the sheet, a page out of the sheet.

Q. Is there any date on that sheet to show that it (110) was made? A. Yes. This says November 12, 1932. Mr. Finne wrote that.

Mr. Byerly: I will offer in evidence the sheet of Mr. Finne.

(Marked Plaintiff's Exhibit 17.)

Q. After these first tests, was any more of this ink run over there at the Curtis plant in your presence? A. Yes. We continued to work with the Curtis Company from that time up until some time, I guess, around the end of August of the following year, 1933. We made constant experimental runs, and some productions during that period.

Q. During this period did you actually sell them some of the ink? I mean that was given for test purposes? A. Oh, we sold quite a little.

Q. Have you made, from your books, a record of the ink which you sold to Curtis? A. This indicates that some of these were paid for and others were in the nature of an experimental lot.

Q. These are notes taken from your account books? A. Yes, sir.

Mr. Byerly: I will offer these in evidence.

The Court: Did you make up the ink for all the experimental runs you made for the Curtis Company?

The Witness: Yes, sir. That is, I did not do (111) it all myself.

The Court: I mean, done by Sinclair & Carroll Company, the defendant?

The Witness: No, it was done by the Cray-Finne Company.

The Court: What was the connection with the defendant, Sinclair & Carroll Company?

The Witness: We had no connection, simply competitors, friendly competitors.

Mr. Free: I object to this list of sales in the record, your Honor. We are getting an awful lot of stuff in here which is immaterial, secondary evidence. Who cares how much ink was sold to Curtis. The witness said he sold some. I think that ought to be enough for the record.

The Court: Objection sustained.

By Mr. Byerly:

Q. Now, Mr. Cray, you said you made up these inks. Where did you get the varnishes or vehicles which you used in it? A. Zinsser & Company.

Q. Is that the company of which Dr. Gessler was the chief chemist? A. Yes.

Q. And they, as I understand, furnished you with the varnish or vehicle of ink, and what you did was mix in the pigment? A. That is right.

(112) Q. When you first started working there at Curtis, did they insist on knowing what was in this ink? A. Why, shortly after the experiments began they did, yes.

Q. Did you then check with Dr. Gessler and find what was in the ink? A. Yes.

Q. What solvent was in it? A. Butyl carbitol.

The Court: Who had made up this ink, Gessler or you?

The Witness: Zinsser, or Gessler's company, made up the varnish and sent the varnish on to us; and we added the pigments, ground them and canned them and shipped them.

The Court: Gessler made the varnish, and you did what?

The Witness: We put the pigments into them and processed them, which means grinding on a roller mill.

Q. The butyl carbitol, as I understand it, was the solvent which was contained in the varnish which was sent to you by Dr. Gessler and the Zinsser Company? A. That is right.

The Court: The butyl carbitol was in it when you got it?

The Witness: Yes, sir. We did add more butyl carbitol in some instances as a thinner. After we got the varnish, we of course always had butyl carbitol to (113) work with.

Q. Were you the regular ink suppliers for the Curtis Publishing Company? A. No sir.

Q. Who was? A. Frederick H. Levey Company.

Q. When you were over to the Curtis Publishing Company did you ever see this ink which you made from Dr. Gessler's varnishes running on the same press with another ink made by someone else? A. I did.

Q. Just describe how that was arranged, what you saw in that connection. A. Well they usually had four pages. Each was on a form, what we call a form. They had split the fountains and the rollers in the middle, and were running two pages with our ink and two pages with a competitor's ink. They were running side by side, and going over the same heating unit, and drying almost alike.

The Court: Two different inks appeared on the same page?

The Witness: Yes—not on the same page, on the same sheet. They split these pages, which were four in a row. That is, what we call the form. The form

consisted of eight pages. There were four across and four this way (indicating). They were split in the middle, two pages, and running on this page—the same ink on four pages on this side, and different ink on four pages (114) on this side. In other words, if this is the roller, you cut it in two and put one ink on one side and one ink on the other side.

Q. How long after you started these tests and informed Curtis of the ingredients contained in this ink—how long after that was it that you saw this competitor's ink running alongside of yours on the same printing press over there?

Mr. Free: Your Honor, I object to this question. I do not see any connection between this defendant and this other ink, or the present status of the case and this other ink. It is all immaterial.

The Court: The other ink is not involved in the case, is it?

Mr. Byerly: The other ink is made by a company that is now one of our licensees. I think this is important, your Honor. The commercial development of the ink brought it right up to the point where the defendant took it, and I would like to show that. I can show it in rebuttal if your Honor prefers, but I thought it would be useful. It may possibly have a bearing on the question of infringement.

The Court: All right; go ahead.

Mr. Byerly: Now will you read the question?

Q. (Read.) A. I think that I furnished Curtis (115) with full information in regard to the ingredients used in our inks along in March or April—not later than that. I think this was July or August that we saw this competitor's ink running on the same press as ours was.

The Court: What year was that?

The Witness: 1933.

Q. Now was Dr. Gessler with you when you saw this competitor's ink running? A. He was with me that day; yes, sir.

Q. Could you tell what the solvent was in this competitor's ink? A. Well, I made a guess at it.

The Court: Don't guess. Do you know?

The Witness: Yes. I think it was a petroleum solvent. You could smell it. It was all over the place. When it went over the steam drum there was a very definite odor of petroleum solvent there. I decided they were using a petroleum solvent.

Q. After you had seen this ink, and some time in the early part of—you say you saw it in 1933—some time in the early part of 1934 did you do any work in connection with trying to find a substitute for this solvent, butyl carbitol, in the ink you were making? A. I did it before 1934. I started working in 1933 on that problem. In fact, I started working shortly after my last visit there (116) to Curtis, when I discovered that they were trying petroleum solvent or running it.

Q. Just tell us what your work in that direction consisted of? A. Well, I undertook to get a petroleum solvent that would give the same results or do the same job that butyl carbitol did, but I am frank to admit that I could not find them in the market. There was just no such animal available, that is, that would give me all the advantages that butyl carbitol would. So I had some friends in the oil business, one of the large oil companies, and I went to him and told him my problem, and he introduced me to one of their chemists, and we discussed my problem. I remember I told him that what I wanted to get was a petroleum solvent of about the same boiling range as butyl carbitol. I figured that if I could get that I would be on the right track. I went to work then with that oil company, and probably two or three months after that time, or in the early part of 1934,

the beginning of 1934, I got from this oil company some very special petroleum solvent cuts which I found were pretty much in line with the boiling range of butyl carbitol.

Q. Did you check the drying of these inks that you made up from these petroleum cuts with the drying of the butyl carbitol inks which you had? A. Yes. I always (117) used that as a yardstick to check on.

Q. What was the name of the oil company from whom you got these very special cuts that you found to be like butyl carbitol? A. Continental Oil Company.

Q. I show you what purports to be two letters from the Continental Oil Company, and ask whether from these you can refresh your recollection as to about the time you were doing this work (handing to witness)? A. Well, this letter indicates that we started this work in the early part of April 17th. However, I am inclined to believe that I might have done a little work even before that first letter.

Q. In what year? A. 1934.

Q. 1934? A. Yes.

Q. You think you started a little before April, 1934? A. Yes.

Mr. Free: Again I would like to interpose an objection as to materiality and relevancy, your Honor. Who cares whether they were working on something else besides butyl carbitol? The patent says butyl carbitol, and therefore it is immaterial if they were working on petroleum solvent or something else.

Mr. Byerly: I think, your Honor, the fact that they found they could make petroleum solvent having the same vapor pressure, and that it was a fairly obvious (118) following up of what the patent says, and this witness himself has described that having worked with the exact illustrative embodiment given in the patent for some time, that he found, not by buying petroleum on the market but by getting a special petroleum cut that had a vapor pressure like

butyl carbitol, he made the same ink. Now I think that bears on the question of infringement, because the petroleum solvent—I will ask the witness that, if I may.

Q. How does the expense of butyl carbitol compare with the expense of petroleum solvents? A. Well, it is about eight times as great, I would say. That was one of the reasons for looking for something cheaper.

Q. And so these hydrocarbons, these inks that you made of hydrocarbons, these cuts which acted like butyl carbitol, with the same vapor pressure, were much cheaper than an ink made with butyl carbitol—is that correct? A. We had a varnish cost of 9 or 10 cents as against a varnish cost of around 31 or 33 cents.

Mr. Free: Even so, your Honor, maybe there was invention made when someone discovered petroleum solvent, but it is not in this patent. All we are concerned with here is butyl carbitol.

. . . . . .

(124) The Court: I will overrule the objection.

By Mr. Byerly:

Q. Mr. Cray, you have just used these letters to point out that it was in the early part of 1934 that you succeeded in substituting this cheaper solvent for butyl carbitol? A. That is right.

Q. Were you at that time aequainted with Mr. Goldthwaite who, I think, was then president of the plaintiff corporation? A. Yes. I met Mr. Goldthwaite on two or three occasions prior to that time.

Q. Do you remember Mr. Goldthwaite writing you for an appointment at the time you were working out these hydrocarbon solvents that were to be used instead of butyl carbitol? A. I do.

Q. Have you looked through your files for the letter (125) you got from Mr. Goldthwaite at that time? A. I have, but I have not been able to locate the original letter.

Q. Can you remember whether he came to see you that Spring after he had written you? A. Yes, he came in April 1934.

Q. Did you demonstrate to him a quick-drying ink which you had made on Dr. Gessler's varnishes, the quick-drying ink which had butyl carbitol in it? A. Yes. I made proofs of both kinds and gave him a general demonstration in the laboratory that evening.

Q. And did you tell him how to select a hydrocarbon which could be substituted for butyl carbitol? A. Yes, sir.

Q. What did you tell him in that connection? A. I told him "If you have a petroleum solvent of about the same boiling range as butyl carbitol you have a solvent that in most cases would be perfectly satisfactory for making printing ink out of."

Q. And you mean by that making an ink that could be dried by heat? A. That is right, a substitute for butyl carbitol ink.

The Court: We will take a recess for ten minutes at this point.

(Short recess.)

Q. Mr. Cray, at the beginning of your testimony you (126) spoke of the fact that since you have been with the plaintiff you were selling inks called Vaporin that are dried by heat on this press, such as you have explained. Now are those inks which the plaintiff has sold since you have been with them for heat drying? Are they made with this solvent butyl carbitol that was in the first varnishes you got from Dr. Gessler or are they made with these cheaper solvents which you found could be used in place of butyl carbitol? A. Most of them are made with the cheaper solvent. A very small percentage of the total is made with

the butyl carbitol solvent for specific or special purposes.

Q. And the solvent in the majority of them consists of these very narrow petroleum cuts such as you obtained from the Continental Oil Company when you were working on this? A. That is right.

The Court: Very narrow what?

Mr. Byerly: Petroleum cuts.

Q. Just tell the Court what you mean by a very narrow petroleum cut. I am not sure whether it was explained. A. A very narrow boiling range of a petroleum solvent. It may be, as was described here, cutting the tail or the initial point off of kerosene. To be most effective and to be more like butyl carbitol they have to have a narrow boiling range. Most petroleum solvents (127) that you can go out on the market and buy might have boiling ranges that run from 100 to 150 degrees from the initial point to the end point. Now those that we used generally have 20 or 22 degrees from the initial to the end. Butyl carbitol I believe has only 11 points from the initial to the end.

Mr. Byerly: That is all.

Cross-examination by Mr. Free:

Q. Mr. Cray, as I understand it, you were aware that the competitive ink used at the Curtis Publishing Company was a high boiling petroleum fraction ink? A. I suspected that it was, yes.

Q. When was that? When did you first see it? A. About in August 1933. It might have been July. I could not swear to that. It was in the hot days, July or August.

Q. That is close enough. And so far as you know the Curtis Publishing Company are still using an ink containing a high boiling petroleum fraction? A. Yes, they are.

The Court: A high boiling what?

Mr. Free: Petroleum fraction—the same "cut" we have been talking about as "petroleum cut".

The Court: You mean that boiling point had a wide range or high point?

(128) Mr. Free: High boiling, narrow range.

Q. At that time you were still using a butyl carbitol ink? A. In our experiments at Curtis, yes.

Q. And when did you change to a petroleum solvent? A. Well, I changed—the Cray-Finne Company changed to a petroleum solvent shortly after that. I had started just prior to that time experimenting with petroleum solvents or we were making some of our inks out of petroleum solvents shortly after that time. However, we had certain business in which we were using butyl carbitol and we continued to buy that also from the Zinsser Company for some time after August 1933.

Q. And when your company was bought out by Interchemical or International Printing Ink, you were then using a high boiling petroleum fraction in your inks, were you not? A. Some of them, and we at that time still were using some butyl carbitol inks for special purposes.

Q. Yes, but the amount of butyl carbitol ink became less and less in volume? A. It certainly did.

Q. Now you spoke of the Paterson Parchment Company test. When was that again? A. May 1932, I think.

Q. And as I understand it, from your previous testimony, those tests continued for several months? A. Yes.

(129) Q. And then after several months' experimentation the Paterson Company gave up the use of the ink? A. That is right.

Q. And that was a butyl carbitol ink? A. Yes, sir.

Q. And one of the reasons they gave it up was because it cracked the ink rollers, didn't it? A. No.

Q. What was the reason? A. I do not think that is quite right. They gave it up mainly because they found

that our crude heating unit had a tendency to distort or take the glycerin out of their paper. It was very important that the moisture not be removed from their paper because that paper was used mainly to pack butter and cheese, and to take the moisture out of it and distort the parchment paper itself made it useless as a wrapper. I would say that they gave up the experiments mainly because the chemical department found that by passing this paper over this steam drum we distorted it, took too much moisture out.

Q. You never sold any ink to them any more? A. Oh, I am selling a lot to them today.

Q. At that time, after the experiments at Paterson? A. Oh yes, after suitable heating equipment was gotten they started using it. Now we have heating equipment available that you can use, that you can run parchment through without distorting it, so they are buying a very (130) substantial amount of their total inks, of the heat-drying type inks today.

Q. With petroleum solvent? A. With petroleum solvent and butyl carbitol. They do use some butyl carbitol for one or two jobs where the question of odor is of vital importance, and I still think we use butyl carbitol.

Q. You are not sure of that? A. Yes, I am sure of one or two.

Q. The reason I am asking you whether you are sure is because in answer to some questions your counsel said that you were selling only a small proportion to the Kalamazoo Parchment Company since 1936. A. Well, that is another company. That account does not happen to be in my district and I am not familiar with the sales situation there.

Mr. Byerly: I think I should say at this point that the answer to the interrogatories stated that we were selling it and we were asked to name a customer and we named this Kalamazoo Company

as a customer, but there was no statement in the answer that it was not sold to other customers.

Mr. Free: I will pass that at this time, but the question was asked to name all the purchasers of butyl carbitol ink and only one was named.

Q. Now in the test that you mentioned at Curtis (131) Publishing Company, you continued to try to use your butyl carbitol ink for a period of about a year down there, did you not? A. Pretty close to a year, nine months or ten months.

Q. And during that time the Curtis Publishing Company gave you all the cooperation you would want? A. They certainly did.

Q. And after that time they gave up the use of the ink, is that right? A. That is right.

Q. And one of the reasons for it was that the rollers cracked and sometimes were so badly cracked the presses had to be shut down? A. That is right.

Q. So far as you know the Curtis Publishing Company never has used any butyl carbitol ink since that time, is that right? A. No, I don't think they have.

Q. The date when they gave it up, that Curtis gave it up was about May 1, 1934; is that about right? A. Yes, I think that is right, about May 1st. I think it was a little bit later than that.

Q. I show you a letter addressed to you, Mr. Frank W. Cray—that is you, isn't it? A. That is right.

Q. —dated May 1, 1934, from Mr. Sterner. Do you recognize that (handing to witness)? A. Yes, that is right.

Mr. Free: That last paragraph explains the (132) situation, your Honor (handing to Court).

The Court: (After reading.) Well, was this butyl carbitol or not?

Mr. Free: Yes, your Honor.

Q. This letter happens to be a carbon copy, but you remember receiving the original? A. Yes, from Sterner.

Mr. Free: I offer in evidence as Defendant's Exhibit B the letter from Mr. Sterner, dated May 1, 1934.

Mr. Byerly: If your Honor please, I object to this exhibit unless the exhibit showing the amount of ink which had been sold to the Curtis Company should be admitted also. This particular letter indicates that a certain quantity was returned at a certain time and it means very little unless there is on the record a complete statement of the amounts delivered and paid for. I offered that during the direct examination of this witness but was ruled out as immaterial. I should like to object on the same grounds of this letter, or else have your Honor permit me to re-offer the total sales.

Mr. Free: Well, I am merely using this letter to fix the date.

The Court: This letter is merely used for fixing a date and also in response to the Court's question if appears that this ink used was butyl carbitol, which (133) was a failure.

Mr. Free: Yes.

(Marked Defendant's Exhibit B.)

Q. Now you spoke about the ovens through which the web passes after being printed. Those are pretty hot, aren't they? A. Yes.

Q. About how hot? A. Well, they get up to say 1200 or 1500 degrees Fahrenheit in the oven.

Q. And if the web should stop and you did not have the safety devices the web would burn, wouldn't it? A. Well, I don't know. I don't think there is much chance of it, of its burning, because you print all your national magazines that way, and if there were many fires they would not be able to get the magazines out.

Q. But they have safety devices when the web stops—A. It automatically cuts the gas off.

Q. What I would merely like to say, if it is fair, is that, at that temperature the web would burn if it were not moving so fast; isn't that right? A. If it came in contact with the flames it would, but the flames are not directly on the paper, you know. They are an inch fo an inch and a quarter away from the paper. Now if the web broke and pieces of it flew into the heater naturally you would get a fire; but in the ordinary course (134) of events I do not suppose they have one fire in a month on these presses.

The Court: How often does the web stop in passing through there?

The Witness: Well, a web might stop every hour for one thing and another, but usually on these high-speed presses they refill their fountains and they do everything automatically, and it is no uncommon thing for this big machine to start rolling on a magazine like Life and not stop for eight or nine hours, run right through. They change paper without stopping. They have these automatic pasters and put new rolls on. All they do to make that change is slow the speed of the presses down. Otherwise they may stop the machine every half hour.

The Court: Is it your testimony the paper would not burn if the web stopped at that temperature of the heater? Would it scorch?

The Witness: Well, you have to understand, your Honor, that these things are automatically controlled and just the instant that the press starts to slow down your gas starts to turn off.

The Court: Well, that is not what I asked you. But if the gas stayed on there and the same rate continued and the web stopped wouldn't the paper be burnt or scorched?

(135) The Witness: It certainly would; no question about that.

The Court: It is obvious.

Q. It would evaporate almost anything that was on the paper, wouldn't it? A. Yes.

Q. That was one of the troubles you found with the Paterson Parchment Paper Company. The heat was too great for the moisture in the paper, wasn't it? A. Well, the crude heating unit that we had was not properly constructed. As I said before we are today doing a tremendous amount of this kind of ink with Paterson because we have learned how to build a refined unit, heating unit. We do not use gas in all heating cases. We resort to the use of steel steam drums and also to the use of plain hot air in some cases, and we also use in these extra fast presses a combination of a hot oil drum, a ribbon burner and hot air in addition to that. All three types are used on some of the presses today.

Q. As I understand it, Dr. Gessler sent you varnishes? A. That is right.

Q. Containing butyl carbitol? A. Yes, sir.

Q. And you being an ink man made ink out of them? A. That is right.

Q. And that was quite a job, wasn't it? A. Yes.

(136) Q. You tried many months before you got a suitable ink, and one of the reasons for it is that you have to fit the ink to the particular job and the paper you are working on, isn't that right? A. That is right.

Q. And almost every time you were called upon to supply ink to a customer you practically have to make a new ink, don't you? A. Well, there are a great many tailored jobs in the ink business.

Q. First you have to find out what sort of paper he wants to print on, is that right? A. That is right.

Q. Then you want to find out how fast the paper should pass? A. That is right.

Q. And you have to know what kind of a press he is working on? A. Yes, sir.

Q. Oh, there are three or four or five different variables that you have to take care of each time you make an ink; isn't that so? A. Yes.

Q. So an ink maker is pretty much of a custom tailor, isn't he? A. Yes, I would say he is.

The Court: You do not carry ink in stock, do you?

The Witness: Oh, yes. There is a certain percentage of the average ink maker's ink which is a standard item taken off the shelf. Possibly 40 per cent and 60 per cent might be special items, highly special items.

(137) Q. You keep up with modern developments in resins, do you not? A. I think so.

Q. You use them whenever you can and price permits? A. Yes.

Q. And solvents the same way? A. Yes.

Q. And pigments the same way? A. Yes.

The Court: What is it that makes the impression on a paper, is that the residue?

The Witness: It is a combination of the resin and the pigment, I would say. When you take your solvent off then you have the pigments and the resin solid left, that is all.

Q. Essentially what does any ink consist of? First you have your pigment, then you have your vehicle, and then in the third class you have— A. Extenders.

Q. And dryers and plasticizers? A. And compounds.

Q. In general ink has always been made that way? A. That is right.

Q. And for certain presses you have an ink which is thick, like typographic? A. Yes.

Q. Other presses you have an ink which is thin like rotogravure for, and then you have inks between, of different degrees of thickness and viscosity? A. Yes.

Q. When an ink is too thick for a certain press you thin it by putting in a solvent usually, don't you? (138) A. If you are working with these oils, you would certainly use a solvent, that is right, but if you were working with a linseed ink you might use a straight, raw linseed oil or a boiled linseed oil. Maybe you would not mix a solvent into the linseed. You would either use the solvent or an oil.

Q. I have often heard inks compared to paints, they are similar, aren't they? A. In some respects.

Q. That is, you have a pigment and you have a vehicle which is oftentimes linseed varnish, and then you have dryers sometimes and sometimes plasticizers? A. Yes.

Q. And these Duco lacquers which you remember back in the early 1920s, they began coming out with solvent solutions of nitrocellulose? A. Yes.

Q. And they evaporated pretty fast and caused what was called the orange peel effect, you remember that? A. Yes.

Q. So they improved that by putting in solvents which did not evaporate so fast? A. Or plasticizers.

Q. And after nitrocellulose was invented or placed on the market, you got a whole series of different solvents for it, do you remember that? A. Yes.

Q. And then after that, other synthetic resins like bakelite came along and then you had to have different solvents for that too, isn't that right? (139) A. That is right.

Q. So the ink business, like the paint business, has been in a state of constant change as new products come on the market, to get advantage of them both for price and for quality, is that right? A. That is right.

Q. Going back to some of this early work you did with Dr. Gessler, it was you, I believe, who suggested the use of heat with this butyl carbitol ink, did you not? A. Well, I don't know as I suggested it. I thought about it a good

deal and it occurred to me, since we were working with pigments that were somewhat similar to lacquers, that it might be possible to handle them somewhat similarly to the way they were handling lacquers, like on automobiles. That is the idea I had in mind, and I told him I had this press out there that I thought I could put some heat on, and I asked him if he would make an ink that would print under those conditions, that would stay stable, and if we could put some ink on it we could try it. He said not only he could, but he had already made it. He named one of the inks he originally sent us as an odorless ink.

Q. And so you tried heat on it and the solvent did evaporate? A. It certainly did.

Q. It is possible also that the idea of using heat was suggested by the rotogravure practice, is it not? (140) A. Yes, I had often thought of that, because there was a great big rotogravure company in the same offices, and it used to break my heart to go down and see them dry by going over some drum, but I realized we had this stability problem and the question of keeping the ink stable on the press.

Q. In this rotogravure process the ink is applied to the web from the— A. The engraving itself, right from the roller. The work on rotogravure is etched underneath the surface. When we talk about letterpress print we are talking about relief printing, or above the surface. This rotogravure cylinder which has all the work on travels right in a big trough of ink. Then the steel doctor blade scrapes the excess ink off, and the balance that is in the pockets below the surface is transferred onto the paper. They have no question of rollers at all.

Q. Then this ink which is deposited on the paper, this fast moving web, is heated and the solvent is driven off, and then you have your Sunday supplement and other magazines that are printed each day? A. That is right.

Q. As I understand it, for letterpress printing you merely use a higher boiling solvent that would not evaporate on the rollers? A. That is right.

Q. Otherwise you had an operation which was very much like rotogravure, the application of heat to the web? (141) A. That is right. Of course, there is a great deal of difference in the amount of heat you have to apply, because with these new closed rotogravure fountains they can use very highly volatile solvents.

Q. It is just a matter of heat. If you have a low boiling solvent you use less heat, and if you have a high boiling solvent you use more heat? A. That is right.

Q. Have you ever seen a hot air dryer which works with Vaporin ink? A. Yes, I have. I built the first one I think myself.

Q. That has a fan in it and it blows air across heating tubes? A. Yes.

Q. Then the air strikes against the web and dries the solvent, very much like a rotogravure heater? A. Very similar.

Q. Only the temperature is higher? A. Only the temperature is higher and it takes a much longer web traveling in that unit than it does on a rotogravure. We are usually forced to run 15 up and 15 down and get 30 feet in the unit in order to get the drying.

Q. What happens to the solvents that are driven off in rotogravure and in Vaporin ink? A. In the Vaporin ink with these hot air units that is one of the advantages. Our heating plant there, the way we heat up our air is we use gas and we take the residue and bring it back and (142) burn it up in the gas furnace; and in rotogravure in the large plants they are reclaiming most of the solvents now. They find it economical to reclaim the solvents.

The Court: Which is the better practice, to use these things with a dryer or to use the heating unit?

The Witness: It all depends on the job. I think a little explaining might be in order. For printing coffee bags and things like that, the hot air unit is better, for this reason, that they only print on one

side of the paper, you see, and you can do many things that way, and the speed is not so paramount as it is on these big magazines. On this type, with the web running anywhere from 700 feet to 1000 feet a minute, you could not use hot air because it would take too much time. You would have to be in there for twenty or thirty seconds in order to do it. So therefore they have to go to extremely higher temperatures for the short period in the heater. The variables are time and temperature. Where you are printing on one side of a web like on coffee bags, you come in here, travel up through your heating unit, and there is not any particular speed problem. You are only printing on one side of the paper as against both sides. So I think you can say that for some operations the hot air method is superior and better than other ones, (143) and for high speed magazine operations that other type of unit is the most satisfactory and most universally used.

The Court: They both use heat.

The Witness: Yes.

The Court: I mean between heating and a self-drying medium that does not need to be heated.

The Witness: A self-drying or oxidizing drying type of ink may take eight hours or maybe 24. We dry in a split second.

Re-direct examination by Mr. Byerly:

Q. You knew about rotogravure printing before you ever saw Dr. Gessler's ink, didn't you? A. Surely.

Q. You knew that was dried by heat? A. Yes.

Q. At that time did you know how to make typographic or letterpress ink that could be dried instantly by heat? A. No, I did not.

Q. You were never able to make such an ink, were you, until after you had used Dr. Gessler's butyl carbitol? A. I never made one at all until after I did.

Q. This letter, Defendant's Exhibit B, from the Curtis Company, refers to returning a certain amount of butyl carbitol ink which you sent them? A. Yes.

Q. Was this the entire amount of butyl carbitol ink you sent them or did you send them others that they (144) actually paid for and used? A. I think that that might be a little confusing, I think, the time Mr. Sterner wrote that letter that he was sending back all the butyl carbitol ink that we had over there, that they had not used and had not paid for.

Q. But were there some others that they had used and had paid for? A. Oh, yes, sir.

Q. You made a record of that in your books, did you not? A. I did. That record shows those that were paid for and those that were sent and returned. The whole story is there.

Q. Will you refresh your recollection from this and tell us the amounts of ink which you sent them which were paid for? A. Do you want me to add these amounts up?

Q. Just read the amounts that were paid for and the dates they were shipped.

Mr. Free: This is just putting in by indirection what we ruled out before.

The Court: If he can testify of his own knowledge that is all right, otherwise it is not. If you recognize those figures to be correct of your own knowledge, why you can give the answer.

A. I think this list is substantially correct. I think you have invoices to indicate those that were paid for and those that were not. I would say this is (145) correct.

Q. Then will you please answer the question, which is, what were the quantities of ink which were sent and paid for? A. In February we shipped 50 pounds. I think I would have to have the invoices.

Q. You have referred to certain invoices. I have the invoices to which you refer. A. I see here June 12th, there

were 30 pounds of ink shipped to them which they paid for. June 21st——

The Court: What year.
The Witness: 1933.

A. (Continuing) June 21st, 1933, 75 pounds, paid for. June 26th, 1933, 229½ pounds paid for. All this ink, 9241, was paid for in full and none was ever returned to Cray-Finne Company. August 11th, 1933, there was a shipment of 100 pounds, paid for in full, none returned. August 16th, 1933, 200 pounds, and another 110 pounds, paid for in full and none returned. February 1933, 50 pounds. March 50 pounds, all paid for. None returned. That covers it.

Q. Then if I understand you correctly, this letter, Defendant's Exhibit B, refers to ink that they had on hand when they decided to give up using this ink, which they then sent back. A. I think that was most of the last few shipments that were not satisfactory probably.

(146) Q. Did the Curtis Company make any complaints to you about the price of this ink while they were buying it from you? A. They certainly did.

Q. Did Mr. Sterner give you any explanation or did you gather from him any reason he had for changing to another ink?

Mr. Free: That is hearsay, your Honor. I do not think that helps any.

Q. I think you said that after stopping using your ink, the Curtis Company continued to use the heat drying ink made with a cheaper solvent, is that correct? A. They certainly did.

Re-cross examination by Mr. Free:

Q. This heat drying ink you said Curtis continued to use, was not purchased from your company, was it, after

1934? A. It was not purchased from us up until a year ago.

Q. Do you know whether that came from Levey? A. Yes, practically all of it came from Levey.

Q. And the ink you have been selling them since last year has been a petroleum solvent ink? A. Yes.

Q. Curtis uses a lot of ink? A. Yes.

Q. They buy it by the carload? A. They are one of the largest consumers of printing ink in America.

Q. These small samples you sent them were mostly (146A) experimental inks, were they not? A. Yes.

(Adjourned until Tuesday, January 19, 1943, at 10:30 a. m.)

---

(147) New York, January 19, 1943;
10:30 o'clock a. m.

TRIAL RESUMED.

Mr. Byerly: Your Honor, I should like to begin by offering parts of some depositions which were taken by the defendant in Chicago, and I believe these depositions are on file with the court. I can indicate the portions that I wish to offer. I do not know whether your Honor wishes to have them read, or what procedure you prefer in that matter.

The Court: I think it will be well to have them read.

Mr. Free: I think that we might save time. I am going to put the whole deposition in when it comes my turn, and it is a defendant's deposition.

Mr. Byerly: I want to read just certain parts of it that bear on the plaintiff's case, particularly on the testimony which has been given by Mr. Bragdon, and I thought to put in these parts as part of my case is proper.

The Court: I think that is right, and you can (148) eliminate those parts when you come to yours.

Mr. Free: I think it would be a little less confusing to read the whole business together.

Mr. Byerly: I do not think the parts will be at all confusing, your Honor.

The Court: The witness's testimony was taken on behalf of the defendant?

Mr. Byerly: Of the deposition of the witness William A. Magie I will offer questions and answers 1, 2 and 28 to 38.

Extracts read in evidence from deposition of William A. Magie, produced as a witness for defendant, who, being first duly sworn, deposed and said:

Direct examination by Mr. Free:

Q1. Please state your name. A. William A. Magie.

Q2. You are connected with the Magie Brothers Petroleum Products Company at 1640 Carroll Avenue? A. That is right.

* * * * * * * *

Q28. Is this Sample II, solvent 502-C, what you would call a narrow cut? A. Yes; yes.

Cross examination by Mr. Byerly:

Q29. How long have you been in the business of selling oils for use as solvents? A. Since the middle to the end of 1938.

Q30. Did you sell any oil before 1938? A. A solvent?

Q31. Yes. A. No solvent. We have been in business for fifty-three years.

Q32. I see. A. Fifty-four years.

Q33. Did you make this narrow cut before 1938? (149) A. No, sir.

Q34. Did you find there was a demand for narrow cut oils as solvents in 1938? A. No; no, we did not.

Q35. Why did you start to sell them then if there was no demand? A. You mean—we started to sell them in 1938, the middle or the end of 1938, because we had requests for oils of that type.

Q36. And, if I understand you correctly, this was the first time you had requests for oils of that kind? A. That is correct.

Q37. Did these requests indicate the purpose for which these oils were to be used? A. Yes; yes, they did. They were to be used in this quick-dry type of printing.

Q38. You have sold narrow cut solvents to the International Printing Ink Company, or Interchemical Company, have you not? A. Yes.

The Court: What is a narrow cut?

Mr. Byerly: A narrow cut is what they call a petroleum fraction with a very narrow boiling range, that is, it is like butyl carbitol in that it does not spread out over a long boiling range but has a very narrow boiling range, and uniform evaporation.

The Court: Boiling temperature range?

Mr. Byerly: Yes, you take a wide cut like kerosene, it is a mixture of so many things that it will (150) start to boil at a fairly low temperature, and you have to keep increasing that temperature, perhaps a hundred degrees, before it is all boiled away; because it is such a mixture, so it does not evaporate uniformly.

Now the deposition of defendant's witness John Krawetz. In this deposition I would like to read questions 1 to 4, 9 and 10 and 44 to 53.

Extracts read in evidence from deposition of John Krawetz, produced as a witness for defendant, who, being first duly sworn, deposed and said:

Direct examination by Mr. Free:

Q1. Please state your name. A. John Krawetz.

Q2. You are connected with the Phoenix Chemical Laboratory, Inc., of 3953 Shakespeare Avenue, in Chicago, are you not? A. Yes, sir.

Q3. What is your capacity? A. I am the President of the Company.

Q4. Will you give me a brief outline of your education and training along the lines of chemicals and fuels? A. I was graduated with a Bachelor of Science Degree from Northwestern University in 1923, and was awarded my Master of Science Degree in 1934, at which time I decided to devote myself exclusively to the study of petroleum and petroleum products, and in that manner I started to work as an engineer and investigator, and finally developed my own laboratory, and have been operating the Phoenix Chemical Laboratory ever since, and we are devoted exclusively to the study of petroleum products.

* * * * * * * *

(151) Q9. Now will you describe briefly what you mean by A.S.T.M. tests that you mentioned? A. The American Society for Testing Materials has established procedures for examining various types of products, amongst them petroleum products.

Inasmuch as petroleum products are, in the main, mixtures of hydrocarbons rather than single chemical identities, it is necessary to very definitely establish the test procedure, because unless you definitely establish the test procedure insofar as, let us say, the distillation is concerned, you may obtain all kinds of results.

In other words, if you distill a mixture of materials by various methods, you will get various distillation ranges,

which is not true in the case where you are dealing with a chemical identity, just one chemical compound.

Therefore, the American Society for Testing Materials has definitely prescribed the flask in which a distillation is carried out. That is, the dimensions of the flask; the position of the side arm on the neck; the diameter of the neck of the flask. They have definitely described the position of the thermometer. They prescribed the rate at which heat is applied to induce distillation. They prescribed the cooling bath.

(152) So everything that is variable, that is, in test procedure, is established because, we have no control over the mixture of the material; that is, we can control the distillation range of the material, but we cannot control the concentration of the individual molecules of hydrocarbon present in the mixture.

So we have to definitely control the test procedure, so that laboratories in different parts of the country and different parts of the world can obtain similar reproducible results.

By Mr. Byerly: I might say in explanation that is the test by which the boiling range we have referred to is established. That brings me to Q44.

Re-direct examination by Mr. Free:

Q44. These hydrocarbons, such as 502-C oil, are in what hydrocarbon series, approximately? A. Well, this material would be a very narrow cut; it might be the very end of the kerosene range, and it might be just a little from the low end of the distillate.

But, in general, this is specially prepared material, because your kerosene and distillate overlap, and you would find that your distillate—within your distillate oil, your fuel oil, would have a lower initial boiling point than this. This is a specially provided fraction.

Q45. That would be in the pentadecane up to the (153) octadecane series? A. Yes, because there are so many branches which increase the boiling points, and so forth. So, at the end; the tail end of kerosene; you might term it.

Re-cross examination by Mr. Byerly:

Q46. You say this is a narrow cut. What is this boiling range of 502-C? A. The boiling range is from 505 to 549 Fahrenheit. It is a 50-degree cut.

Q47. It is really less than 50 degrees; about 4— A. 44.

Q48. 44 degrees, Fahrenheit? A. Yes, 44 degrees Fahrenheit. But that is a mighty close cut. You can call it 44 if you want to; but in refining operations two or three degrees either way means very little, because you are dealing with mixtures and you have big equipment. Your equipment is accurate but not precisioning equipment.

Q49. What is the ordinary boiling range of the ordinary kerosene? A. Oh, the boiling point of kerosene might start in at 380, 375, although they used to run it through, get it at times at almost 600; but the good kerosene will run from 385 to 520.

Q50. That is the boiling range, 140 degrees Fahrenheit, is that right? A. Yes, that is right.

Q51. How about fuel oil, what is the boiling range of that? A. Well, that depends whether that is a No. 1, (154) 2 or 3 distillate, and if you term that the fuel oil, you may say it is around 380 and runs up to the very heavy stuff that will crack before it will distill.

The Court: What does "crack" mean? That means breaks up into its component parts?

Mr. Byerly: No, it means that the heavier hydrocarbons in it break up into lighter hydrocarbons, instead of going off into gas when you heat. That is the process, as your Honor probably knows, of making gasoline out of heavy oil. It is a heating

process that breaks these big molecules up into small ones in the same series.

Q52. What is vapor pressure? A. Vapor pressure of a material is the pressure developed by the substance against the atmosphere. You see you have several materials, like hydrocarbon mixture, millions of little molecules. Some of them have energy driving them out; others are coming in. Now, the force generated by those trying to get out against those that are falling back, and the resistance they exert against the atmosphere is your vapor pressure.

Q53. If the liquid is actually boiling, what is it? A. 760, under ordinary atmosphere. Now, like today, if your barometer is 750, then the boiling liquid is 750. Then again, if you put pressure on it, then that is (155) different. But under ordinary atmosphere, generally speaking, it is 760.

Mr. Byerly: I will now call Dr. Gessler.

ALBERT E. GESSLER, called as a witness on behalf of the plaintiff, being duly sworn, testified as follows:

Direct examination by Mr. Byerly:

Q. What is your present position, Dr. Gessler? A. I am director of research of the Interchemical Corporation.

Q. You are a graduate chemist, have a Doctor's degree in chemistry? A. Yes. I graduated with a Ph. D. degree from the University of Berlin.

Q. And you have been engaged for many years in industrial chemical work in the United States? A. Yes, since the year 1910.

Q. Were you ever chief chemist of Zinsser & Company? A. Yes, I was. I was chief chemist and a member of the board of directors.

Q. What was the business of Zinsser & Company? A. They were makers of chemicals and pigments and dyes.

The Court: Is that Zinsser?

The Witness: Zinsser.

Q. Where were they located? A. They were located at Hastings-on-Hudson.

(156) Q. When were you with them, Dr. Gessler? A. From the year 1926 to the year 1934.

Q. Did Zinsser & Company sell any pigments to Cray-Finne Company? A. Yes, they did, for a long time.

Q. What was the business of the Cray-Finne Company? A. They were makers of printing inks.

Q. Were you acquainted with Mr. Cray of that company? A. Yes, personally.

Q. Did Mr. Cray ever take up with you any problem in connection with printing ink? A. Yes, he did.

Q. When was that and what problem did he put up to you? A. That was in the year 1930. It happened that at that time at a meeting with Mr. Cray he explained to me that there would be a large outlet for odorless inks for the purpose of printing food wrappers, particularly on parchment paper, and he asked me at that time if it would be possible to make an odorless ink. He told me that they had tried for years to make odorless inks and had failed and he wondered if I would be able to make an odorless ink for that purpose. The reason that he had a suspicion or an idea that I might be able to make such an ink was that he knew——

The Court: Is this what he said to you or is this what you understood? Just state what he said in a discussion at any time, not what you thought, but (157) what he said to you.

The Witness: Well, I could not repeat it verbally. That is in the year 1930.

The Court: Give the substance.

The Witness: The substance was, could I make odorless inks for him. He also told me that he had failed to make odorless inks himself.

Mr. Free: I do not think this is very helpful as to what Mr. Cray told him about his own success or failure in making inks. That is all hearsay. What are we trying to prove?

Mr. Byerly: I am inclined to agree with that. The problem that Mr. Cray put up to the witness is all I wish to bring out. I think that is plainly admissible.

Mr. Free: So may we have that answer stricken?

The Court: Strike that last answer out.

Q. In 1930 when Mr. Cray put this problem up to you what knowledge did you have of printing? A. I was engaged in the manufacture of pigments from the year 1910 on. Now our customers, customers for pigments were either paint manufacturers or printing ink manufacturers. In order to sell pigments to printing ink manufacturers naturally I had to have some idea about making printing inks on a laboratory scale, and I have made many, many myself all these years on a laboratory (158) scale.

Q. At that time also I suppose you had seen printing presses running? A. Oh, yes.

Q. And you knew generally what a printing press was? A. Yes, I did.

Q. Did you know what the ordinary printing ink used on printing presses was made of? A. Yes. The printing inks at that time were mostly made—most of them—of drying oil, vegetable drying oils like linseed oil, perilla oil and chinawood oil and similar vegetable oil products.

Q. How do such oils and the inks containing them dry? A. They dry by oxidation.

Q. And how long a process is that? A. It goes from hours—the drying takes from hours to days. It all depends

if the sheet where the ink is printed upon is exposed freely to the air or if other sheets are piled on top of it.

Q. Now when you were asked to get them an odorless ink did you try to make up an ink out of these usual drying oils? A. No, because I knew that these drying vegetable oils took on a great deal of odor during the drying period and that it would never be possible to make an odorless ink out of a vegetable oil.

Q. What did you adopt as the vehicle for an odorless (159) ink in your work? A. It happened that at that period I was engaged in making a great many dispersed pigments and I had a good understanding of solvents and of lacquers, and I knew that in order to make an odorless ink it could not be done by drying oil but it would have to be done by a solution of an odorless binder in a solvent.

Q. By dissolving a binder in a solvent could you make something thick like linseed oil, that is, similar consistency? A. Oh yes, yes. By dissolving resins, natural or synthetic resins or cellulose products, like nitrocellulose, in a binder a great deal of viscosity is attained that way and heavy-bodied solutions are the result, looking very much like bodied linseed oil varnishes.

Q. Now did you keep a notebook of your work when you were with Zinsser & Company? A. I did.

Q. Can you recognize this notebook which I now hand you (handing to witness)? A. Yes, I do.

Q. What is that book? A. I do recognize it. It is a record of my laboratory experiments that I made during that period.

Q. Does the book contain dates when you did the work? A. Oh yes, it does.

Q. How in general are the notes on the various experiments arranged in your book? A. They are arranged (160) in a series by numbers and each large major series is arranged by a number and the subdivisions are arranged by the alphabet, A, B, C, D, E, F and so on, and again subdivisions of that.

Mr. Free: Your Honor, it sounds like we are getting into date of invention, which is premature. That is for rebuttal. We have not attacked the validity of the patent yet or its date of invention.

The Court: What is the probative value of this, Mr. Byerly?

Mr. Byerly: I think, your Honor, that while unquestionably it bears on the validity of the invention that in this case Mr. Free has raised the question of infringement, apparently, as his principal defense and has put forward the argument that there is no infringement because the claims are broader than what Dr. Gessler invented. Now while it is impossible to keep that defense entirely separate from the defense of invalidity I feel that the best way to answer that is rather not by argument but by bringing before your Honor at this time all the facts relative to the making of this invention and the development of it. I think that will give a clearer understanding of what the patent teaches and will enable you to pass on the question of infringement.

(161) The Court: Well, he has not attacked your patent yet.

Mr. Free: No.

The Court: Until he does it is not necessary for you to defend it.

Mr. Byerly: I think in a way he has attacked——

The Court: He has indicated he will.

Mr. Byerly: He has indicated that he will attack it, that he intends to attack it. That is about as far as he has gone.

The Court: You cannot anticipate his case by putting your defense on ahead of it. So I think this is immaterial and I will sustain the objection for the present.

Mr. Byerly: Then I will limit the examination of this witness at this time, your Honor, to a few

points which I think perhaps bear more directly on the question of infringement.

Q. Dr. Gessler, you are the inventor named in the patent in suit, are you not? A. I am.

Q. Since you have been with the Interchemical Corporation that company has sold quick-drying inks commercially, have they not? A. Oh yes, they have.

Q. The specific ink given as an example in your patent contained butyl carbitol as a solvent, did it (162) not? A. Yes, it does.

Q. Taking these heat set inks which the plaintiff is selling commercially at the present time do they all contain the same identical solvent as that named in your patent? A. No, with a restriction, that they are not chemically the same but the physical qualities are very similar.

Q. Is there any resemblance between the vapor pressure of the solvents used in these inks and the vapor pressure of butyl carbitol? A. Yes, they are very similar.

Q. Can you point out in what respects there is a similarity? A. The vapor pressure of butyl carbitol and the vapor pressure of these solvents we are talking about now, mainly petroleum solvents, are characterized by three qualities.

The first is that the vapor pressure at ordinary temperature, at room temperature is so low that it does not evaporate on the rollers of a printing press. It has been found that butyl carbitol possesses a vapor pressure low enough to do that. So if a solvent has a vapor pressure as low as butyl carbitol it is quite certain that it will not evaporate on the rollers of a printing press.

The second quality of the vapor pressure characteristics of butyl carbitol is that upon rise of (163) temperature, particularly above 100 degrees Centigrade, which is the boiling point of water, the vapor pressure rises very, very fast and it rises so fast that it rises to a good thousand-fold

as it was at the temperature of 20 degrees, which is room temperature.

The third vapor pressure characteristic of butyl carbitol is that since it is a chemical compound and therefore has a very narrow boiling range, that if it is exposed to high temperature it will evaporate at a constant rate from beginning to end.

Those are the three outstanding vapor pressure characteristics of butyl carbitol, and those are the three outstanding vapor pressure characteristics of the petroleum solvents that are used in these fast-drying inks.

Q. Now in regard to the second characteristic which you mentioned, that is, the rapid rise in vapor pressure up to a thousand-fold over what it was at room temperature, to what order of vapor pressure does butyl carbitol rise when heated above 100 degrees? A. In order to explain that I would like first to explain the yardstick by which it is measured. It is measured in the metric system. So that in order that we all understand the metric system, perhaps you will permit me to say a word about it. The unit of the metric system is a meter, which is a little bit longer (164) than a yard. A meter is divided into 100 equal parts and that makes centimeters. A centimeter is divided into 10 parts and that makes a millimeter. The next smaller measure is a thousandth of a millimeter, which is called a micron.

The vapor pressure of butyl carbitol at 20 degrees Centigrade, which is room temperature, is of the order of 20 microns. The vapor pressure of butyl carbitol at raised temperature, say, at 150 degrees Centigrade, is in the level, now, of centimeters. It is something like 6 centimeters, which is more than a thousand times what it was at 20 degrees. While the temperature has only risen from 20 degrees to 150 degrees, the vapor pressure has increased a thousand-fold.

Q. As to these petroleum solvents used in the inks which the plaintiff is selling now, is there any vapor pressure such

that at 150 degrees Centigrade it is of the order of centimeters? A. Yes, they are all of the order of centimeters.

Q. You have mentioned three characteristics of the vapor pressure of butyl carbitol, do you know of any solvents which have these three vapor pressure characteristics, which may not be substituted for butyl carbitol in the specific ink described in your patent, and produce a satisfactory ink?

(165) Mr. Free: We are trying to follow the patent here. The patent mentions only one solvent, butyl carbitol, and he is asked now to name some more.

The Court: He names that merely as an illustration.

Mr. Byerly: That is right.

Q. (Read.) A. Yes, I do. The patent names one other quality that solvents of that nature must possess, and that is that they must form a stable solution with a binder that is dissolved in it. That is very essential. It happens that there are solvents which form non-stable solutions, solvents that have the same vapor pressure characteristics as butyl carbitol, but, however, form non-stable solutions with binders. An example of that is, for instance, a solvent called diethylene glycol. The reason that this solution is not stable is that this solvent is hygroscopic. That means that it attracts very readily the moisture that is contained in air and thereby constantly becomes larger in volume, or diluted with water. If, now, a solution of the binder, let me say nitrocellulose or a synthetic resin, is made in diethylene glycol, and it is exposed to air as it would be in a very thin film with a tremendously large surface on the rollers of a printing press, it would attract so (166) much water during that comparatively short time, so much moisture out of the air, that the binder that is dissolved in that solvent would not remain in solution but would commence to precipitate out because the solvent has been diluted with water.

Q. Now, Dr. Gessler, do you know of any solvents which have, I think, the four characteristics which you have now mentioned, that is, the three characteristics of the vapor pressure of butyl carbitol and also the ability to make a stable solution with a particular resin binder, which is to be used in an ink, which could not be substituted for butyl carbitol in the ink described in your patent? A. I do not think I got the question.

Q. (Read.) A. I do not know such solvents.

The Court: Is butyl carbitol used in all commercial inks?

The Witness: Well, butyl carbitol and materials —I do not think I got the question fully yet.

Q. I think perhaps the question was not clear when it was read. Supposing I say it again. You have referred to three vapor pressure characteristics of butyl carbitol; you have also stated that in order to be satisfactory in your ink the solvent which is used must dissolve the ink binder and form a stable solution? (167) A. That is right.

Q. Now, I am asking you whether you know of any solvent which has these three vapor pressure characteristics of butyl carbitol, which you have mentioned, and which also has the characteristic of forming a stable solution with the ink binder, and which could not be substituted for butyl carbitol in the ink of your patent? A. If a solvent has the three vapor pressure characteristics of butyl carbitol, and if the solvent forms stable solutions with the binder—that means, now, we are not concerned with the chemical composition of the solvent at all, we are talking about physical properties of the solvent. Is the question do I know other solvents than butyl carbitol, or what is the question?

Q. Perhaps I have not made it clear. You have said that the petroleum solvents, for instance, which are used in commercial inks by the plaintiff have these physical characteristics, the four similarities to butyl carbitol in the

matter of vapor pressure and the ability to hold the resin in solution, that is correct? A. That is correct.

Q. And what I am trying to bring out is whether those four physical characteristics are sufficient to indicate that a solvent is stable for use in your ink?

(168) Mr. Free: The questions are very leading. I think if we are getting a point here in infringement, let us have the witness testify.

The Court: The objection is sustained.

A. Solvents that have these four characteristics and, for instance, possess a very strong odor, could not be used in place of butyl carbitol.

The Court: What you want to know is whether there is any other solvent than the one, butyl carbitol, that has these four characteristics?

Mr. Byerly: No, if your Honor pleases, what I am trying to ask the witness, and perhaps I have not made it plain to him—he has named these four physical characteristics of butyl carbitol, which also apply to the hydrocarbon solvents which are being used commercially instead of butyl carbitol, and all I am asking him is whether these four physical characteristics form a criterion for determining whether a particular liquid will make a satisfactory solvent in his ink. If that is not a proper question I withdraw it, but that is the substance of the question.

The Court: It is proper, but you do not make it clear either to the Court or to the witness.

The Witness: It is not clear to me. I admit.

The Court: Perhaps you can break it up in some (169) way.

Q. I will try breaking it up, as the Court suggests, and I think perhaps that may make it a little clearer. Is any part of the work which you have done in connection with

this heat-drying ink, indicative that it is necessary that the solvent should have a vapor pressure as low as the vapor pressure of butyl carbitol at ordinary room temperature?

Mr. Free: We have been all over that before, it seems to me. The same question was asked and answered before.

The Court: I do not recall it.

Mr. Byerly: I do not think it was, Mr. Free.

The Court: I will let him answer it again.

A. A solvent to be usable for this class of thing must have a vapor pressure as low as that of butyl carbitol.

Q. When did you ascertain that, Dr. Gessler? A. When did I what?

Q. When did you find that out? A. In the year 1930.

Q. You said that another characteristic of butyl carbitol's vapor pressure is that when you heat it to above 100 degrees Centigrade—say to 150, its vapor pressure is of the order of centimeters? A. That is correct.

(170) Q. Did any of your work indicate that this was a necessary characteristic of the solvent which is to be substituted for butyl carbitol? A. Yes, it did.

Q. Your patent mentions, does it, a substance known as dibutylphthalate? A. It does.

Q. And it refers to that substance as a plasticizer and not as a substitute for butyl carbitol? A. It does.

Q. I show you Exhibit 5, will you point out anything there which bears on the question of what order the vapor pressure should have at 150 degrees in order that the solvent may be successfully used in place of butyl carbitol? A. It should be of the order of centimeters at 150 degrees Centigrade.

Q. What is the order of the vapor pressure of the substance dibutylphthalate, which is also referred to in your patent, but merely as a plasticizer and not as a drying solvent? A. It is about a tenth of a centimeter.

Q. So that could not be used to replace butyl carbitol? A. No, because it is not up to the level of centimeters in its vapor pressure at 150 degrees Centigrade.

Q. You have already pointed out another characteristic of the vapor pressure of butyl carbitol is the uniformness of its vapor pressure while it is evaporating. A. That is correct.

(171) Q. Is that characteristic required in a solvent in your ink? A. Yes, it is.

Q. And you have also pointed out that if an attempt is made to use in your ink the solvents which will not make a stable solution with the binder, that they are unsuccessful, the solvents cannot be— A. It is unsuccessful.

Q. Would the ink be stable on the press if the solvents did not hold the binder in a stable solution? A. No, it would not.

Mr. Byerly: Of course I should like to illustrate some of this by going into this witness's early work in developing the invention, but in deference to your Honor's ruling I will hold that for rebuttal.

That is all.

Cross examination by Mr. Free:

Q. Do I understand you correctly to say that diethylene glycol would not be a suitable solvent for an ink of the heat-set type? A. It would not for most of the binders used.

Q. What is its vapor pressure at 150 degrees? A. I would say it is similar to that of butyl carbitol.

Q. Except for its great affinity for water, it would otherwise be a good substitute for butyl carbitol, would it not? A. I do not know if it would be a good substitute.

Q. But it is in that same class? A. I really have (172) never made a fast-drying ink with diethylene glycol.

Q. But its principal difficulty is its great affinity for water? A. Yes, it is therefore used for water-setting inks

that are set and dried by the addition of small quantities of water in the form of mist spray.

Q. I have here a set of curves, marked Defendant's Exhibit A for identification, which has on it a curve for diethylene glycol, will you please check me to see whether I am reading the vapor pressure accurately at 150 degrees Centigrade? I make it about 24 millimeters, or 2½ centimeters, is that about right? A. Yes, that is about correct.

Q. Do you remember, Dr. Gessler, your experiences with butyl carbitol inks in the early days? A. Yes, I do.

Q. Particularly with the difficulty of drying out the ink rolls? A. Yes.

Mr. Byerly: I should like to object to this, your Honor. Your Honor has excluded me going into this witness's early work and placing the whole history of it before you, and now he is to be cross-examined as to that, which I think is entirely irrelevant to the direct and is an attempt to put in the cross examination before the direct examination.

(173) Mr. Free: This is after the patent issued. This is the inks that were tried down in the Curtis Publishing Company in 1933 that I am asking about.

Q. (Read.)

Mr. Byerly: That relates to the time long before the patent issued.

Mr. Free: No, your Honor, this has to do with the testimony that we had out of Mr. Cray yesterday about the difficulties of the Curtis Publishing Company.

The Court: Try to tie it up into that, and I think it will be all right. Your question is general. Reframe your question.

Mr. Byerly: I should like, if this is to be gone into, to have the privilege of asking some direct questions, to bring out in sequence the matters which your Honor allowed to be put in through Mr. Cray, as to the development of this witness's ink at Curtis and elsewhere.

The Court: You can ask those later. Withdraw your question and tie it right into the Curtis situation.

(174) Mr. Free: Yes.

Q. Dr. Gessler, you recall, do you not, the experience you had at the Curtis Publishing Company with your butyl carbitol ink tests? A. Yes, I do.

Q. And at that time there was considerable difficulty owing to the drying out of the glue glycerin rollers? A. There was difficulty.

Q. And that difficulty is due to what? A. That difficulty is due to extracting some water out of the rollers. I would like to go into that—you made the statement yesterday which was not——

The Court: Never mind. Just answer the question.

Q. Answer the question and then stop. A. All right.

Q. I will ask the next question. That was due to the affinity that butyl carbitol has for the water in the ink rollers, was it not? A. That was due to——

The Court: Can't you answer yes or no?

The Witness: Yes.

Q. And because it had a great affinity for water the butyl carbitol sucked the water out of the ink roller, is that right? A. It did not suck it out. Water is soluble in butyl carbitol, but that does not mean any sucking effect, does it?

Q. Well, let us put it this way: the water passed (175) from the ink roller into the butyl carbitol of the ink, did it not? A. Yes.

Q. Now, Dr. Gessler, I would like to read to you a passage from one of your later patents, No. 2,128,672, issued August 30, 1938——

Mr. Free: A copy of which I offer in evidence as Defendant's Exhibit C.

Mr. Byerly: I object to that, your Honor, as immaterial, a later patent. It has no bearing on the patent in suit, and cannot possibly be an anticipation.

Mr. Free: I will connect it up with the patent in suit.

The Court: With that understanding, go ahead.

(Marked Defendant's Exhibit C.)

Q. You do not have a copy, do you, Dr. Gessler? A. I have it in my brief case.

Q. Well take this one (handing to witness). A. Thank you.

Q. Now referring to Defendant's Exhibit C, your patent, in the very first two lines it refers to the patent in suit here, does it not, which is No. 2,087,190? A. It does.

Q. And then it goes on, in that first paragraph, to describe the properties of that ink, does it not? A. Yes sir.

(176) Q. And it states that the ink contains diethylene glycol monobutyl ether, which we have been calling butyl carbitol here, does it not? A. No, it does not.

Q. That is in lines 13 and 14, the first column on page 1. A. Well, but it speaks about solvents which possess physical properties like those characteristics of diethylene glycol monobutyl ether.

Q. It does mention butyl carbitol, doesn't it? A. It mentions it as an example, yes.

Q. Then I would like to read this to you, beginning at line 54 of the first column on page 1:

"Many printing presses, and especially those used for fine printing, are equipped with a very sensitive type of ink-distributing rollers, carrying the ink from the fountain to the printing plates and consisting generally of mixtures of glue, glycerine and water or similar materials. If these rollers are used with the printing ink of my said co-pending application, they"——

Now that refers to the patent here in suit, does it not? A. Yes.

Q. Which mentions butyl carbitol; is that right? A. That is right.

Q. "they"—that is these rollers—"are subject to deterioration by reason of the tendency (177) of the ink to extract some of their constituent substances. This is explained by the fact that the solvents used in the preparation of the ink are miscible with water and/or glycerine or glycerine substitutes, and during their use with such ink-distributing rollers a slow extraction or exchange of these substances from the roller material takes place and the rollers eventually are rendered hard and inelastic and unable to carry and distribute the ink evenly and satisfactorily over the printing plates."

Now that is predicated on what you learned at Curtis and elsewhere, is it not? A. That is correct.

Q. And as we said before, the difficulty that you experienced there was due to the extraction of the moisture from the rollers by the butyl carbitol; is that right? A. That is correct.

Q. Now is diethylene glycol any more or less characteristic in its affinity for water than butyl carbitol? A. It is much more. It has a much greater affinity for water, in that it is hygroscopic. That means it extracts water out of the air at a very fast rate. Butyl carbitol does not do that.

Q. Butyl carbitol does, but not at the same rate? A. That is right; in a very very much smaller rate.

(178) Q. So that your principal objection to diethylene glycol is that it is hygroscopic?

The Court: What does that mean?

Mr. Free: Hygroscopic means extracting water, sucking it out of the air, or whatever it happened to be in contact with.

The Court: Absorbing water?

The Witness: Absorbing water; yes.

Q. And this patent, just to characterize it, Defendant's Exhibit C, was for the purpose of correcting the difficulty that you had with butyl carbitol in that respect, was it not? A. In the respect to glue-glycerine rollers.

Q. That is why you say down here in line 27 of the second column:

> "With ink-bearing rollers of this type, therefore, I have found it advantageous to use an ink which will not extract substances from them, particularly water, glycerine, or its substitutes."

Is that right? A. That is right.

Q. And then you propose the substitution in this patent of butyl carbitol acetate? A. I do.

Q. For butyl carbitol? A. I do.

The Court: Do you mean that butyl carbitol absorbs water from the inks and the presses?

(179) The Witness: No. May I explain that, your Honor.

The Court: Yes.

The Witness: There are a number of different materials from which the rollers, the distribution rollers of a printing press, can be made. They can be made from rubber, or they can be made from a number of synthetic substances, or they can be made of a mixture of glue and glycerine and water, which makes a very rubber-like substance. It happens that when

butyl carbitol goes or streams over these rollers all day long—and it must be for a long time—that some of the water which is contained in these glue-glycerine-water rollers dissolves in the butyl carbitol of the ink, extremely little at a time, but as it goes on for hours and hours and as it streams over the rollers a little bit of water, infinitesimal at the time, is always dissolved, and finally, after many hours or days, the rollers become hard on the surface and start to crack in little microscopic cracks. That is what is called cracking of rollers.

Q. So that we have—

The Witness: May I say something else, your Honor?

The Court: Yes.

The Witness: Rubber rollers, which were used (180) at that time, also contain no water, and therefore butyl carbitol is not able to extract water out of rubber rollers and therefore does not affect them.

Q. See if you will agree with this general statement, then, Dr. Gessler: that both butyl carbitol and diethylene glycol are hygroscopic, in the sense that they have a considerable affinity for water, but butyl carbitol is less so than diethylene glycol. A. It is very much less so. To that I agree.

Q. Referring again to your patent No. 2,128,672, which mentions butyl carbitol acetate, would you say that that substance has the four characteristics that you mentioned a while ago for printing ink of this type? A. Surely.

Q. And what is its vapor pressure at 150 degrees? A. It is of the order of centimeters.

Q. How many? A. Perhaps 2 or 3 centimeters. I do not recall it exactly, but it must be about 2 or 3 centimeters.

Q. Will you look at Plaintiff's Exhibit 5, and tell me (handing to witness). A. (Witness examines chart.)

Q. About 40, isn't it? A. It is about 4 centimeters.

Q. Forty millimeters, isn't it? A. Yes; 40 millimeters is 4 centimeters; that is correct.

Q. We were talking a while ago about high boiling (181) petroleum solvents that are used in place of butyl carbitol in the inks furnished by your company; do you remember that? A. Yes.

Q. I think you mentioned the vapor pressure at room temperature of these petroleum solvents, but I am not sure I heard you say what its vapor pressure is at 150 degrees Centigrade. A. They are of the order of centimeters.

Q. Give me a more exact answer. How many centimeters? A. Well the order of centimeters runs from 1 centimeter on up, does it not?

Q. Yes. You answer the question. I want to know from you how many centimeters the vapor pressure of these high boiling petroleum solvents are at 150 degrees Centigrade. A. I would say it is between 1 and 5.

Q. Your patent says that butyl carbitol has a vapor pressure at 150 degrees Centigrade of 60 millimeters or 6 centimeters? A. That is right.

Q. Do these high boiling petroleum fractions that you use in your inks have the same vapor pressure at 150, namely, 6 centimeters? A. No. They do not have exactly the same. They have a vapor pressure of the same level.

Q. I want to get an idea how close they are. Is it 50 centimeters, or 40 centimeters; or 30? A. No, no. I said before it was between 1 and 5 centimeters, so it (182) couldn't be 30.

Q. I am talking about millimeters, 50 millimeters. A. I beg your pardon.

Q. We are using the same term as in the patent? A. Yes.

Q. Let us be consistent. Let us talk about millimeters from now on, shall we? A. Yes.

Q. Then tell me what the vapor pressure of these petroleum solvents that you are now using in your inks is at 150 degrees Centigrade, in millimeters? A. It is between 10 and 50 millimeters.

Q. Can't you give it to me any closer than that? A. It all depends which solvent your refer to.

Q. Take one of the solvents that you use, and give me the vapor pressure of it at 150. A. May I see the chart and give you the vapor pressure of this 502-C solvent? Will that be satisfactory?

Q. I am asking you about your solvents, not the defendant's solvent. A. We have solvents that have vapor pressures of 2 and 3 and 4 centimeters, I would say.

Q. 2 and 3 and 4? A. Yes—even 5.

Q. That means 20 or 30 or 40 millimeters. A. Even 50. It would depend for what speed of a press it is designed.

Q. Do you have any inks now on the market that contain (183) a petroleum solvent having a vapor pressure of 60 millimeters at 150 degrees Centigrade? A. I don't know. I really don't.

Q. You are director of research of Interchemical Corporation, are you not? A. I am.

Q. And you do not know that? A. No, I am not in the manufacturing end. I haven't worked on that for the last five years.

Q. So that as near as you can tell me the vapor pressure of your petroleum solvent is somewhere between 20 and 50 millimeters at 150 degrees Centigrade; is that right? A. I would say so.

Q. Pretty wide range, isn't it? A. No. I think it is an extremely narrow range, when you consider the vapor pressure under 100 is a thousand times less, so that makes a very narrow range. You have to multiply by 1,000 in order to get to that range.

Q. Let us put it this way. Do the inks of 20 millimeter vapor pressure at 150 act the same as the vapor pressure—

A. I beg your pardon?

Q. Do the inks having a solvent vapor pressure of 20 milimeters at 150 act the same as those having vapor pressures of 50 millimeters? A. They dry a little bit slower.

Q. How much slower, on the same press? A. That is (184) regulated—let me see if I can answer you in this way. If a slower solvent is used the press will have to run slower, or more heat will have to be used in order to get the same degree.

Q. On the same press, with the same heat? A. Yes.

Q. The lower vapor pressure solvent dries much slower, doesn't it? A. It dries slower; that is correct.

Q. Now I think you said, Dr. Gessler, that your patent here in suit specifies that the solvent must have a narrow boiling range, did you not? A. I said——

Mr. Byerly: I object to that. I do not think the witness has tried to say what the patent states, your Honor. I certainly have not asked him.

Q. Well did you say that? A. I said that I compared all the solvents that are usable in inks of this character to butyl carbitol. Now it happened that butyl carbitol is a chemical compound and not a mixture. That means, to anyone who knows solvents, that it has a very narrow boiling range.

Q. Do you find any mention, anywhere in your patent, that the solvent must have a narrow boiling range? A. No, it must not be—no, I am sorry.

(Short recess.)

(185) Q. Going back to your visit at the Curtis plant, I think it was in 1933 or thereabouts. A. Yes.

Q. Do you remember a parallel printing operation which was conducted in the plant at that time? A. I do remember one distinctly.

Q. And that was with Levey's ink? A. Yes.

Q. And that ink contained a high boiling petroleum fraction? A. I believe it did, but we were not told.

Q. Did you ever have occasion to test it, the Levey ink? A. You mean then at that time?

Q. Yes. A. No.

Q. But you know, don't you, that Levey has been using high boiling fraction in their inks ever since 1933? A. I don't know. I know they use it now. I do not know what happened between 1933 and 1935, or 1934.

Q. When did you first find out that they were using the petroleum solvent in their ink? A. Let me go back to "what they were using". I saw an experiment. Whether they used it I have not the faintest idea. I only knew that much later, when I became associated with the Interchemical Corporation.

Q. That was in 1934? A. Yes, but then I did not know it either. It took another year or so before I knew it definitely.

Q. When did Interchemical change over to a high boiling (186) petroleum solvent for the largest proportion of its heat-set ink? A. I would say they started changing over from the year—the beginning of 1935 on. It might have been the end of 1934.

Q. That is close enough. A. Yes.

Q. Will you refer to the patent in suit. There is a reference there in the second column of page 2, line 28, to another application. The passage reads:

> "This method of printing is not claimed herein as it forms the subject matter of my co-pending application, Serial No. 15,944, filed April 12, 1935, which is in part a continuation of this application."

Do you find that there, Doctor? A. Yes.

Q. That application has been abandoned, has it not? A. It has been.

Q. And the method there described in that application was the method of printing with the ink which is shown in this patent, is that right? A. Yes, in the larger sense.

Q. Doctor, there too the method was passing the printed web underneath a heater, or in a heating zone, to touch off the solvent? A. If it was printed on both sides. That was an essential part.

Q. So that we understand it, this patent here in suit (187) has nothing to do with the method of printing? A. Yes, I understand.

Q. You said you had a good understanding of lacquers and solvents even way back when you were with the Zinsser Company? A. Yes.

Q. And you have made a practice ever since to keep in touch with new solvents that come out on the market? A. Fairly.

Q. You read the industrial journals and publications? A. Oh, yes, sir.

Q. And the advertisements of solvent manufacturers? A. Many of them.

Q. That is also true of new resins that come out from time to time? A. Yes.

Q. And pigments? A. And pigments.

Q. And whenever you can and the price permits, you use them in your inks, do you not? A. Oh, yes.

Re-direct examination by Mr. Byerly:

Q. Dr. Gessler, Mr. Cray has said that you furnished him with what he called varnishes containing butyl carbitol, which were made into inks and used by the Curtis Company, is that correct? A. That is correct. I also furnished him with pigments.

Q. With the pigments? A. That is right.

Q. Then in order to make what you supplied to him in (188) the ink, it was necessary that you combine the substances that you sent him? A. I sent him varnishes of

different bodies, similar to the bodies of the linseed oil varnishes that they were using.

Q. Were these varnishes all made of butyl carbitol and a binder? A. They were made of butyl carbitol and a binder, with some plasticizers in there. Yes, that is correct.

Q. And they had different degrees of thickness? A. Yes, the reason for that is, let us talk for instance about nitrocellulose. Nitrocellulose comes in many different degrees of viscosity. That means one nitrocellulose will dissolve in a given amount of solvent to a very thin solution. The same amount of nitrocellulose, but a different nitrocellulose, will dissolve to a very heavy body solution.

The Court: Does that mean in the same solvent?

The Witness: That means in the same solvent, only the nitrocellulose is different. There are very many different grades, and thereby the body of the varnish can be altered.

Q. And that enabled Mr. Cray to exercise his skill as an ink maker in determining the exact thickness he wanted his ink? A. Yes.

(189) Mr. Free: I object to that. We do not know that, do we? We do not know that Mr. Cray was able to use his skill to do that.

The Court: Qualify him as an expert. The objection is overruled.

A. Yes, he did, because he had a line of varnishes similar in body to the linseed oil varnishes that he was using beforehand.

Q. Did you personally go down to the Curtis Publishing Company and see these butyl carbitol inks printed on big presses, I mean, presses with rollers and webs? A. I did.

Q. Did you personally observe the ink on the ink rollers of these presses? A. No.

Q. Did you personally observe the drying of the ink? A. No, I observed that the ink did not dry on the ink rollers.

Q. Oh, you observed the ink rollers, but you did not see any drying, is that it? A. Perhaps I did not get your first question.

Q. You saw these presses in operation with your butyl carbitol ink? A. That is right.

Q. Did the ink dry on the inking rollers of the presses? A. Oh, no, it did not. That was one of the main points.

Q. You personally ascertained that it did not by (190) looking at it? A. Oh, yes, looked at it and felt it.

Q. Did you make any similar personal observations on the condition of the ink after it had been printed and passed through the heater? A. Yes, I saw it and felt it.

Q. Did it dry? A. It dried.

Q. Did you receive any complaints from the Curtis Company as to the inks drying on the ink rollers or failing to dry when they went through the heater? A. No, there was no complaints.

Q. Was there any complaint from Curtis on any other point? A. Yes, there were complaints that the rollers started to dry after long runs with these inks. They were glue-glycerine rollers.

The Court: After a long run?

The Witness: After a long run. It takes hours and hours to get these effects of these microscopic cracks on the surface of these sensitive rollers.

Q. These cracks, as I understand it, are something that you cannot see with the naked eye but have to see with a microscope? A. That is correct. They are very, very small.

By the Court:

Q. What harm do they do, make a rough surface? A. Yes, they fill up with ink and they start to print very fine

(191) hairlines over the paper, but they are never large cracks; they are microscopic almost in size.

Q. Those are just the rollers that transfer the ink alone? A. Yes, and they had these glue-glycerine rollers in the place where they transfer the ink to the printing plate.

Q. Because of this double motion effect I should think those little cracks would show? A. It is only if the rollers that contact the printing plate itself are glue-glycerine. They do not move sidewise.

Q. The rollers that did do not move sidewise? A. No, not the rollers.

Q. The one just receiving that? A. They all move sidewise.

Q. They put the ink on the last roller? A. Yes.

Q. Doesn't that move sidewise? A. Yes.

Q. Then there would not be any crack on the last roller? A. May I point out here? (Indicating.)

Mr. Byerly: This is Exhibit 14.

A. (Continuing) This is the printing cylinder where the plates are fastened to the cylinder. It is these rollers here. There are four, 1, 2, 3 and 4, that contact this printing cylinder. If these rollers should be cracked they would, after a long run, show fine hairlines in the printing on the paper. With all the other rollers (192) it would not matter.

Q. Those last four do not have the side motion then? A. No.

Q. They do not move on their axis? A. They can turn around their axis.

The Court: I thought there was a lateral motion.

Mr. Byerly: They do not have the endwise motion.

The Witness: They do not have the endwise motion, the last four.

By Mr. Byerly:

Q. Did you take any steps to meet these complaints, Doctor? A. Yes, I did.

Q. What did you do? A. I looked for a solvent that had the same characteristics as butyl carbitol, but would not affect the glue-glycerine rollers.

Q. Did you find such a solvent? A. I did not find it in the market. The way I found it was that I spent a few days at the Mellon Institute at Pittsburgh, and we went over all the new solvents that the Mellon Institute had worked out, so we are not talking about commercial solvents. We are talking about laboratory samples. And going over very many and specifying the characteristics the solvent must have, we found one that I took home with me and found it to work.

The Court: You found it worked?

(193) The Witness: Yes, I found it worked.

Q. And that, as you have said, was the solvent butyl carbitol acetate? A. That is butyl carbitol acetate.

Q. Now, you have been asked about seeing another ink run on the same press as your ink, when you were down at Curtis one time? A. Yes, I saw that.

Q. Did you write out and sign a memorandum of what you saw on that trip to the Curtis Company? A. I did, I remember it distinctly.

The Court: When you found this butyl carbitol acetate, that was a better solvent than butyl carbitol?

The Witness: It was not better. It just had the qualities that it did not crack the rollers any more.

The Court: You adopted that then for your ink and gave up butyl carbitol?

The Witness: Yes, to a large extent. May I explain? At that time I experimented mainly with

the Curtis Company and with the experiments with them butyl carbitol was replaced by butyl carbitol acetate.

Q. The Curtis Company was not the only one to which inks with your varnishes were being supplied at that time? A. No, the Manufacturers Printing Ink were also supplied with printing ink of this nature by me.

Q. Did those contain butyl carbitol or butyl carbitol acetate? A. Both.

(194) The Court: Since that time then have you used the acetate instead of the other?

The Witness: We used the acetate where glue-glycerine rollers were used. It happened that the experiments that the Manufacturers Printing Ink were making were used on presses which had rubber rollers, and no cracking occurred on those rollers.

Q. You said you made a memorandum of your observations when you saw the Levey ink run on the same press as your ink? A. I did.

Q. Can you recognize the paper which I now show you (handing to witness)? A. Yes, I do. It is signed by myself.

Q. Will you refresh your recollection from that and tell us both the date at which you saw your ink and the Levey ink running on the same press at Curtis, and also what you observed? A. It says here, "Report on test. Runs at the Curtis Publishing Company in Philadelphia."

Mr. Free: That speaks for itself, doesn't it?

The Court: He is asking him to read it.

Mr. Byerly: I asked him to refresh his recollection. I suppose it is a technical matter, whether he reads it out loud or reads it to himself and then states the substance.

The Court: Are you going to offer it in evidence?

(195) Mr. Byerly: I thought I would show it to counsel on the other side, but I think it might be more proper to refresh his recollection.

The Court: Have you any objection?

Mr. Free: No, but I would rather not have him read it.

The Witness: This refers to runs made from February 9 to February 22, 1934. The report was signed by me on February 26, 1934.

Q. Now, will you read it through and refresh your recollection, and then tell us what you observed at that time in February, 1934, at the Curtis Company? A. I observed that the Curtis officials had pronounced the rollers to be unaffected and as good as new after 560,000 pages were printed. The Curtis Company also pronounced that the drying was instantaneous.

The Court: What is this, with butyl carbitol acetate or the other?

The Witness: I think this is butyl carbitol acetate ink. That is correct.

Mr. Free: You do not remember, do you, Doctor?

The Witness: It gives the composition of the ink at the top, and it uses a varnish 107C4, and I am quite certain that is a butyl carbitol acetate ink.

The Court: How many pages was that, how long (196) a run?

The Witness: 560,000. It further says that an examination of the rollers after the press had been stopped for almost an hour by Dr. Gessler and Mr. Cray, showed that no drying of the thin ink film on the rollers had taken place.

Q. What did you observe as to this Levey ink that you saw being run on the same printing press? A. I noticed that there were eight pages printed side by side on this press. Four of these pages were on the lefthand side and

were printed with our ink. The four pages on the right-hand side, all in one row streaming off the press, were printed by another ink, which we understood and were told was an ink by Levey. I would like to read a few sentences out of my report. I noticed that the prints of this Levey ink on the paper were not as dry as the prints of our inks. They were not fully dry, and I also noticed that while we examined the rollers on the press after about an hour's stop, that the Levey ink had almost completely dried on the rollers while ours was as wet as ever.

Q. You have already said, I think, that you ascertained or guessed that this was an ink with a petroleum solvent, did you not? A. Yes.

The Court: The Levey ink was not as dry as your (197) ink?

The Witness: On the paper.

The Court: But on the roller it was dry?

The Witness: It was dry, that is correct.

Q. Did your observations of these two inks running on a press with a heating unit enable you to make any comparison between the vapor pressure of the solvent in your ink and that used in the other ink? A. Yes, I think that was quite evident, and the conclusion of it was quite evident, and that is that the ink must have contained solvents which evaporated much faster than our solvent did. That is why they dried on the rollers. It must also have contained solvents that dried much slower than the solvent in our ink. That is why it did not dry on the paper. So I concluded that this was a mixture, a very wide cut of petroleum solvents.

Q. You saw both your butyl carbitol inks and your butyl carbitol acetate inks run at the Curtis plant, did you not? A. I did.

Q. What if any difference did you observe in the condition of the two inks on the rollers of the press? A. The rollers that were used for printing the butyl carbitol acetate

inks were in perfect condition after 560,000 pages had been printed, and were pronounced by the Curtis Publishing Company to be perfect and not (198) affected, while in previous experiments—in reality I had never seen the rollers after a run. It was always so that when I was in Philadelphia to watch a run, that after the next day the Curtis Publishing Company called up and informed Mr. Cray over the telephone that the rollers had cracked and showed signs of——

Mr. Free: I object to that as hearsay.
The Court: Strike it out.

Q. Did you observe any difference in your ink made with butyl carbitol and your ink made with butyl carbitol acetate, in the matter of the stability of the ink on the inking rollers? A. No.

By the Court:

Q. Was it true then that the acetate solvent corrected all the faults that had been found in the butyl carbitol? A. That is correct.

Q. On glue rollers? A. On glue-glycerine rollers.

Q. You had no problem on the rubber rollers? A. Had no problem at all.

Q. Did they use rubber rollers at the Curtis plant? A. No, they used rubber rollers at the plant where the Manufacturers Printing Company applied these inks.

Q. Over here in Passaic or Paterson? A. No, they made later on larger runs at Kalamazoo, with the Parchment (199) Company in Kalamazoo.

By Mr. Byerly:

Q. In the matter of the stability of the ink on the ink rollers and the drying of the ink on the paper, did you observe any difference between the butyl carbitol ink and

the butyl carbitol acetate ink when you saw these tests in Philadelphia? A. No.

Q. In discussing diethylene glycol in connection with ink, you said it was hygroscopic, is that correct? A. That is correct.

Q. If such a substance, diethylene glycol has a resin dissolved in it and is exposed to the air, what happens? A. The solvent will absorb water out of the air, therefore becomes diluted with water, and will not be able to carry the resin in solution any more.

Q. Does that mean the resin would be precipitated? A. The resin will start to precipitate. That does not mean all of it will precipitate. It will start to precipitate as it absorbs water.

The Court: Will water attract water?

The Witness: It absorbs water from the air.

The Court: It already has water in it, hasn't it?

The Witness: No.

(200) Q. Does this precipitation of the solvent occur in your butyl carbitol ink when it is exposed to the air? A. No.

The Court: What is the difference between butyl carbitol and butyl carbitol acetate, I mean, in layman's language? What do you put into it?

The Witness: Butyl carbitol is compounded with acetic acid, and therefore loses a great deal of its solubility in water. It is still soluble in water, but not fully any more, only to a certain extent.

Q. Doctor, you have spoken of selling ink or furnishing your butyl carbitol ink to the Manufacturers Printing Ink Company. A. Yes.

Q. What was the individual in that company with whom you did business? A. It was Mr. Detrick, with whom I was friendly.

Q. Did you make any personal notes as to the inks or varnishes which you supplied to Mr. Detrick of Manufacturers? A. Yes.

Q. I show you a memorandum. Can you refresh your recollection from that and tell us what dates you supplied ink or varnish to Mr. Detrick, and whether it contained butyl carbitol or butyl carbitol acetate? A. This is a sheet that was written on May 3, 1932. It refers to varnishes that were made for Mr. Detrick, as it says here. (201) The varnish was called L varnish. It consisted of butyl carbitol and nitrocellulose, mainly. There was no butyl carbitol acetate in it.

Q. I show you another memorandum. Can you ascertain from this as to whether you sent any other of these varnishes to Mr. Detrick, and also whether they contained butyl carbitol or butyl carbitol acetate? A. Yes.

Q. What is the situation now? A. These are sheets written in the year 1932. They run from August 8 to November 5, 1932, and they refer to a number of samples, large and small, sent to Mr. Detrick.

Q. What solvent did those samples contain? A. They contained butyl carbitol, according to these sheets.

Q. I show you another memorandum. Does that enable you to refer to any other sales of varnish to Mr. Detrick? A. Yes, here is the sheet that runs from May 3 again to November 5, 1932, and it gives a long list of materials sent to the Manufacturers Printing Ink Company.

Q. Do those sales include butyl carbitol or butyl carbitol acetate? A. Butyl carbitol.

Mr. Byerly: That is all.

Re-cross examination by Mr. Free:

Q. I believe you said in answer to his Honor's question that the butyl carbitol acetate solved the roll cracking problem? A. Yes.

(202) Q. The reason I ask that is because in 1938 when you gave testimony in the litigation with Levey, you were asked this question:

> "Q. Did you ever succeed in solving the cracking of rollers when you used an ink having butyl carbitol in the composition? A. No."

A. You are talking now about butyl carbitol?

Q. Yes, the answer is no, you never did solve it. A. I did not solve it with Levey.

Q. And butyl carbitol acetate did solve it? A. It solved it with the Curtis Publishing Company, because it fitted their glue-glycerine rollers.

Q. So that the answer you gave in 1938 is still true, that is, you never succeeded in solving the roller cracking problem with butyl carbitol ink? A. On glue-glycerine rollers, that is correct.

Q. Now the cracking was not the only problem you had with glue-glycerine rollers when butyl carbitol ink was used, was it? A. I am not aware of any other at the moment.

Q. The reason I ask that question is because in your patent No. 2,128,672 you stated at line 14 of the second column that "the rollers eventually are rendered hard and inelastic and unable to carry and distribute the ink evenly and satisfactorily over the printing plates." (203) A. Well, that is all the same phenomena.

Q. That is, these glue-glycerine rollers are supposed to be soft? A. That is right.

Q. And they act something like a clothes wringer roller? A. That is correct.

Q. They distribute ink from one roller to another? A. That is correct.

Q. If they get hard they cannot do that? A. They do not carry so much.

Q. So it was not only the cracking that was the difficulty; it was the hardening as well, is that right? A. Yes. They are the same phenomena.

The Court: They would not crack until they got hard?

The Witness: That is right. The cracking is simply a symptom of hardening, is it not?

Q. So what you would get is no transfer of the ink from the fountain to the type? A. Less transfer.

Q. Not sufficiently even to do a good job? A. That is right.

Q. And the Curtis Publishing Company prints the Saturday Evening Post? A. They do.

Q. Ladies Home Journal? A. They do.

Q. All high class publications in your opinion? A. Yes, sir.

(204) Q. And that sort of printing with hard rollers would not do the work according to their requirements, is that right? A. That is right.

Q. You were satisfied, were you not, that Curtis Publishing Company had done everything it could to solve the problem before it discarded your ink? A. No, I was not.

Q. You thought they turned you out too soon? A. Certainly.

Q. This solvent which you refer to in the memorandum you had, referring to the Curtis situation, was all butyl carbitol acetate, was it not, that is, the two inks shown, 9816 and 9836? A. Yes, that is right.

Q. In the second one here shown you used 45 pounds of the ink and that, according to this report, showed signs of cracking the rollers after 70,000 impressions; do you remember that? A. I do.

Q. And that was butyl carbitol acetate, wasn't it? A. Yes. You see the difference between the two?

Q. What is the difference? A. The difference—may I explain that to you?

Q. Go right ahead. A. Butyl carbitol acetate is improved over butyl carbitol in that it is less soluble in water than butyl carbitol. It is not fully insoluble in water and

water is not fully insoluble in butyl (205) carbitol acetate. So for very long runs there still would be some water extracted out of these glue-glycerine rollers. I have found that the addition of 1/8th of one per cent of water and 1/8th of one per cent of glycerine to these inks gives a perfect balance that no water was fed into the roller and no water was fed from the roller into the ink. It arrived at a perfect balance. Now these two inks here, the one containing 1/8th of one per cent glycerine and 1/8th of one per cent water, as I recall, and the other one does not. That is the only difference. They are both butyl carbitol acetate inks.

Q. So under some conditions butyl carbitol acetate solves the cracking problem and under others it does not, is that right? A. It did.

Q. Did you ever make an ink with diethylene glycol as a solvent? A. I worked with diethylene glycol many times in my life.

Q. Did you ever make an ink with diethylene glycol as a solvent? A. That is right, yes.

Q. Did you happen to know that there is an ink on the market which uses diethylene glycol as a solvent? A. I do.

Q. Did you ever have any experience with that ink soaking up too much water from the air and becoming (206) unusable? A. I did, I did.

Q. That ink, however, is in commercial use currently in large quantities, isn't it? A. May I enlarge on that?

Q. Yes. A. You realize that the water contents or the moisture contents of air differ widely over the year; that is, in winter time a pressroom is about as dry as the desert of Sahara. In the summer time it contains 60 to 70, up to 90 per cent of humidity. Now if you print this ink, which is very sensitive to the moisture and water in a very dry pressroom in winter time there is no difficulty. If you attempt to print this ink in the summer time there is all the difficulty in the world and we would like to know how to solve that.

Q. Do you know of any pressroom which is bone dry in the winter time? A. Well, by bone dry I mean 20 per cent humidity, or something like that, yes.

Q. Have you ever noticed that in these large press plants they spray water in the air to keep the air moist? A. Some of them do.

Q. Curtis Publishing Company does. Did you notice that down there? A. No, I haven't been in Curtis ever since the year 1933—or more.

Q. And the reason they do keep the air moist is not on account of the ink but because the paper must not get too dry, isn't that so? A. That is so, but we are (207) not talking about large amounts of moisture in the air.

Q. So that your position is that in the humidified plants the diethylene glycol ink could not be used? A. If they fed too much vapor into the air they cannot use it, I maintain that.

Q. How about 40 per cent humidity? Is that too much? A. No, I think they might be stable at 40 per cent humidity.

Q. Most pressrooms are maintained at 40 per cent humidity, are they not? A. Not to my knowledge.

Q. You do not know anything about that? A. No. In the summer time they cannot possibly, unless they are air-conditioned. They do not contain the 40 per cent humidity; they contain 80 per cent.

Q. In the winter time they maintain at least a 40 per cent humidity, is that right? A. The ones that are air-conditioned.

Q. And those that spray water in the air; that is true, too, isn't it? A. Yes. May I say that the Curtis Publishing did not have an air-conditioned pressroom and water spray when I saw it.

Q. But you know that to be a familiar practice now? A. Yes, some pressrooms have it.

Q. The spray? A. That is right.

Q. Those runs that were made at Curtis on your ink (208) back in 1933 and 1934— A. Yes.

Q. —those were test runs, were they not? A. They were.

Q. And the Levey ink test was also a test run? A. So far as I know.

Q. Did you ever get any re-orders of ink from the Curtis Company after those runs? A. Certainly. That is why we kept on going.

Q. And then after about May 1934, I believe Mr. Cray said, you severed your relations? A. He severed his relations.

Q. Yes. A. That is correct.

Q. And that was because Curtis could no longer make your ink work? A. No.

Q. Is that right? A. No.

Q. You do not know what the facts are? A. No.

Q. They gave up the use of your ink? A. That is right.

Q. Now these rollers that are used on high-speed presses get pretty hot, don't they—the ink rollers? A. Yes.

Q. How hot? A. 30—may I enlarge on that?

Q. Yes. A. It might interest you that the glue-glycerine rollers will melt if they are heated above 35 degrees Centigrade. From that you can imagine how (209) hot these rollers got at Curtis.

Q. How hot do the rubber rollers get? A. Some of them get even hotter. They are not so sensitive.

Q. Say 40 or 50 degrees above room temperature, Fahrenheit? A. It might.

Q. That is because of the friction and the stickiness of the ink? A. In a long run.

Q. Yes. A. Oh yes, on account of friction.

Q. You mentioned Mr. Detrick. A. That is right.

Q. He is a relative of yours, isn't he? A. That is right —by marriage.

Mr. Free: That is all.

Mr. Byerly: That is all.

Mr. Byerly: I will call Mr. Detrick.

CALVIN DETRICK, called as a witness on behalf of the plaintiff, being duly sworn, testified as follows:

Mr. Byerly: If your Honor please, I find that the letters which this witness I think will need to refresh his recollection were very unfortunately not brought over this morning. I did not expect to get this far. It is near adjournment time. If your Honor would not mind adjourning now——

The Court: We will adjourn until two o'clock.

(209a) Mr. Byerly: May I ask your Honor, would it be possible to have a slightly longer adjournment? I have two witnesses who have come in from Chicago this morning. I haven't had a chance to speak to them. Would 2:30 inconvenience your Honor?

The Court: Not me, no.

Mr. Free: It is quite all right.

The Court: Then we will adjourn until 2:30.

(Recess to 2:30 p. m.)

---

(210) AFTERNOON SESSION.

Mr. Byerly: I have a witness under subpoena, Mr. Hurley, who has just advised me that he has made all his plans for a trip that will take him away for about a month up in Canada. I will say frankly to your Honor that it is strictly rebuttal testimony. He ought to be here next week, but he is very anxious to avoid that, and if your Honor would take it now de bene esse——

The Court: Any objection?

Mr. Free: No, I would not ordinarily, but this puts off my case considerably more, and I have some witnesses coming from out of town too.

The Court: Is he a long witness?

Mr. Byerly: No, he won't be.

The Court: I will allow it, as an exception in this one case. He takes the place of Mr. Detrick, then?

Mr. Byerly: Yes. I will call Mr. Detrick as soon as he is through.

MARTIN J. HURLEY, called as a witness on behalf of the plaintiff, being duly sworn, testified as follows:

Direct examination by Mr. Byerly:

Q. Mr. Hurley, what is your occupation?

(211) The Court: It is understood that this is rebuttal testimony only?

Mr. Byerly: Yes.

A. Superintendent, Conde Nast Press.

Q. Where is that press located, Mr. Hurley? A. Greenwich, Connecticut.

Q. How long have you been engaged in the printing business? A. Oh, 30 years.

Q. Has some of your experience been in connection with rotary printing presses? A. Yes, a lot.

Q. Are you familiar with the press known as a rotary web perfecting press? A. Yes.

Q. Are you familiar with a sheet fed rotary press? A. I am.

Q. Would you explain to the Court. Describe those two sorts of presses to the Court? A. The difference between a sheet fed press and a web press is the sheets are single sheeted from a roll and then put into the press, both presses running from curved plates and printing on the same type of cylinders. A web press is where the paper will run right off the roll through the same curved cylinders. In our particular plant, and in the majority of plants, it comes out in folded signatures, meaning in 16-page booklets.

There are many types of sheet fed presses and rotary fed presses also. Rotary fed presses do deliver (212) flat sheets.

Q. But in these web presses, as I understand you, the paper goes through as a continuous web? A. That is right.

Q. And the so-called perfecting web press, in that there are two printing cylinders, and one prints on each side of the web? A. Yes.

Q. And in the sheet fed rotary press you have separate sheets of paper. How are they carried through the press? A. By rollers and grippers onto a delivery into the box in which they are delivered. It is on a string belt leaving the front end of the press.

Q. Sort of travelling tapes that pull the sheet along? A. It is a string delivery.

Q. Does that kind of a press print on one side or both sides? A. One side usually.

Q. When was your first experience with this web perfecting type of press? A. I would say 1916-1917.

Q. Whereabouts was that located? A. Southgate Press, in Boston.

Q. What kind of ink were you using at that press at that time? A. At that particular time the only ink I knew at least was just oil ink.

Q. That is just the ordinary linseed printing ink? A. Yes.

(213) Q. How long does linseed oil printing ink take to dry? A. It varies. I think some manufacturers have it now where it dries in eight hours. Many times, on larger sheets, it takes 24 hours to dry.

The Court: That is what you call oil ink?

The Witness: Oil ink. It depends on the size of the sheet. Where no oxidation can get into the paper it takes a much longer time for the sheet to dry. We happen to run a sheet 52 by 80, and it takes quite a long time in some cases to have our oil inks dry.

Q. In this web perfecting press where you used the oil inks some years ago, how were you able to print the second side of that web while the ink was still wet on the first side? A. It was necessary in that case to run what is known as a travelling tympan. It is usually a sheet of treated manila, and that passes between the inked side of the first printed side and the underneath sheet of paper, and in a case like that as a general rule much of the ink is absorbed off of the printed sheet, naturally, because it is being compressed. When you are making the second printing and it does not give you—well, you might say a full inking, as full of ink as you would like to carry—if you carry too much of it you will get a lot of smut and dirty sheets passing through into your box.

(214) Q. You referred to this travelling tympan. I wonder if you can explain that, how that works, by means of this diagram?

Mr. Byerly: I do not think the witness has seen the diagram.

A. It is what you call a travelling tympan. It is a sheet of manila the same size, sometimes a little larger than the sheet on which you are printing, and that must travel in between——

The Court: It cannot go through the press?

The Witness: Yes, it does. It travels through here. Here is your offset. Here is the offset roll. You have got a four-color plate here. The plates are on this cylinder here. The offset roll travels under that paper. Here is your paper coming down. In other words, this has the first impression. It prints here, prints the color plate then the black plate, and the printing on this side is on the top side. The wet side of the sheet faces the flat tympan, the flat impression cylinder.

The Court: This is the tympan here?

The Witness: This is the tympan here, and this travels underneath it, so when it takes an impression here it squeezes the sheet naturally to make a certain amount of pressure, and a certain amount of lick off (215) goes into this travelling tympan. When this is rewound you must take the roll away and put another roll in, and after a certain length of time, maybe the tenth time, the roll comes in a position where you will get the same roll you had here back in again, and in the meantime that ink has been dried up and absorbed so that it does not smut readily again.

The Court: This is the printed sheet?

The Witness: This is the printed sheet.

The Court: And here is the tympan here?

The Witness: That is right. The wet side of that sheet now, after it gets over here, is the bottom side, while the wet side over here is the top side. This is a two-color on one side and a four-color on the other. That is actually what that winds up to be.

Q. The number of colors does not affect the use of the tympan? A. No sir.

Mr. Byerly: I offer in evidence the diagram just explained by the witness.

(Marked Plaintiff's Exhibit 18.)

Q. As I understand you this tympan coming on to the wet ink on the first side picked off some of the ink? A. Well, it naturally does. If you take any particular wet sheet of paper and place it against another the other sheet is bound to lick off some, but this tympan is (216) treated in such a manner as to have a minimum— —

The Court: Is it dry?

The Witness: The tympan itself?

The Court: Yes.

The Witness: Yes, it is.

The Court: It would absorb moisture?

The Witness: As I say, it is treated to a certain extent to have the absorption at a minimum.

Q. But it actually does take ink off the printed sheet? A. When the volume of ink put on is too great. That is where the trick comes in.

Q. I see. So that in using this expediency it limits the amount of ink you can put on the printed sheet? A. That is right.

Q. With this arrangement with oil ink and web perfecting presses, and the tympan, could you get what is considered high quality printing? A. What is that again?

Q. (Read.) A. That is a kind of difficult question. It all depends on the quality that is necessary for the magazines being produced. I would say that you wouldn't get the quality that can be had by the use of the other type of ink.

The Court: What are the names of the publications that are printed by the Conde Nast Publications?

(217) The Witness: Well, our magazines are mostly oil inks, except the New Yorker and Field and Stream and several other magazines which we produce today. The quality has improved so vastly over what it was previously in the past, probably seven or eight years back. The majority of printers have gone to this type of printing rather than staying to the old-fashioned type.

Q. When you say "gone to this type of printing" you mean they adopted a different kind of ink? A. That is right.

Q. What is the name of the publication you get out on this web perfecting press with the oil inks—ten years ago did you say it was, or more than that? A. Oh, a long time before that, back in 1917; "Modern Priscilla".

Q. Now in your present plant out at Conde Nast you have both the sheet fed presses and the web perfecting type of press, do you not? A. That is right.

Q. What type of ink do you use on the sheet fed presses which print only one side of the sheet? A. Oil inks.

Q. How long after you have printed one side do you wait before you print the other side? A. As I said before, there is a variation; it all depends on the type of paper you are using, and the size of the sheet.

Q. Well is it a matter of hours or a matter of seconds? (218) A. No, no, it is hours; it isn't seconds at all. Eight hours is minimum, probably; 22 to 24 in some cases.

Q. What kind of ink do you use on your web perfecting presses that you have out at Conde Nast? A. All Vaporin.

The Court: Oil Vaporin or all Vaporin?

The Witness: All Vaporin.

Q. That is Vaporin ink? A. Yes.

Q. That is a brand of heat set ink, is it not? A. That is right.

Q. And from whom do you get that ink? A. International Printing Ink Company.

Q. When you are using that Vaporin ink on your web presses do you use this travelling tympan you have told us about? A. No sir.

Q. Do you use the kind of press with a heater which is shown in this diagram, Plaintiff's Exhibit 14 (indicating)? A. That is just about the same; Selas heater.

Q. And this is the type of web perfecting press that you use at Conde Nast? A. Yes.

Q. When did you first put in web perfecting presses out there? A. During the year 1937.

Q. Do you remember the circumstances under which you first bought rotary web perfecting presses at Conde Nast? A. Well there are several circumstances you might say. (219) Competition was one. Our customers wanting greater speed and volume in producing their magazines

on faster schedules, and having weekly publications where the distribution was so short and probably had to distribute most of the stuff within two or three days, why it became necessary to have a faster delivery and a faster printing job, plus maintaining the same quality which the customer insisted on.

Q. What particular weekly magazine were you printing at that time? A. The New Yorker magazine.

Q. And the publishers wanted that turned out faster; is that it? A. That is right.

Q. How many of these web perfecting presses did you buy for printing the New Yorker? A. Well, we did not buy all of them for printing the New Yorker. The New Yorker does not take all that we bought. We bought three.

Q. You bought three? A. Yes, sir.

Q. How much of an investment would that be? A. Oh, I would say half a million dollars.

Q. How does the printing quality that you get by using those web perfecting presses compare to what you got years ago when you used an oil ink on a web perfecting press? A. Well, I do not think there is any comparison in the old type of oil ink with the present Vaporin.

Q. In other words, you get high quality print if you (220) have the heat set ink? A. That is right. You can carry more full color and dry faster and have a cleaner job.

Q. Would you have bought web perfecting presses and made this big investment for printing the New Yorker, if you had to do the sort of work that you had previously done on web perfecting presses with oil inks? A. I doubt it very much.

Q. When did you first see a typographic printing ink that could be dried in a few seconds by heat? A. In 1936.

Q. Where did you see that? A. Why, I heard about it, and I had some member of the International Printing firm come to the plant and discuss it, and we saw the possibilities of it and were willing to share the expense in putting it in our own plant to experiment with, which we did.

Q. What kind of a press did you make these experiments on? A. We put it on a sheet fed rotary press in which we split the machine in the middle in order to get room to put the heaters in, at a cost of probably $5,000.

Q. Did those experiments convince you that the ink could be dried very rapidly by heating? A. It certainly did.

Q. By the way, both your sheet fed presses and your perfecting presses fed the ink to the rollers—I mean (221) fed the ink from the ink fountain to the printing cylinder through a long series of rollers, did they not? A. That is right, in order to break it down.

Q. Breaking it down I suppose means thinning it out, spreading it out? A. Makes it more printable, refines it.

Q. How long after you get the copy for The New Yorker do you have the plates running on your web perfecting press? A. The editors of course give us a closing date. That actually is not copy. That is after all revisions are made. We usually have plates on the press four hours afterwards. Our job is made ready about five hours later, and then we are under way; probably say nine hours.

Q. And how long is it before the edition is printed? A. The first edition—we have two editions. One edition is off in about ten hours, and the other edition probably takes us 14. They run a City and an out of town edition, you understand.

Q. How large are these editions? What is the circulation? A. Roughly, one is about 80—the City edition, called the City edition, which is made for a radius of 50 miles of New York—this is what is termed the City edition, and then they have an out of town edition which carries some advertising which is not in the (222) original edition. That is probably—oh, 170, 165. It varies a little bit each week.

Q. You mean 165,000 copies, do you? A. That is right.

Q. And the City edition 80,000 copies? A. Right.

Q. What other magazines do you print on these rotary web perfecting presses with the heat dried ink, out there at Conde Nast? A. Well, we have several. We have Nation's Business.

Q. Can you tell me roughly the circulation of that? A. I wonder if that is the right thing to do.

The Court: What is that?

The Witness: The circulation of various magazines; regardless of what they are, many publishers are very meticulous about that.

The Court: Aren't these audited? Don't they audit them?

The Witness: Oh, yes. There is no discussion about that.

The Court: I mean doesn't the world know that?

The Witness: Well, the A. B. C.—the American Bureau of Circulation—audits it, but many times they print more than the guarantee for you. I do not know whether there is any objection or not.

Mr. Byerly: I should not imagine there would be, (223) your Honor, because it seems to me most of these publishers are always telling how big their circulation is.

The Witness: You would be surprised if you were a publisher.

The Court: Well, the Court has no objection. Suppose you go ahead.

Q. Just give it approximately.

The Court: Approximate your figures.

A. Well, Field and Stream, about 350,000; Charm Magazine, about 330,000; Grade Teacher, 120,000; The New Yorker, 80,000 and 170,000; Glamor, 400,000; Nation's Busi-

ness, 400,000; Skyways, 200,000; Air Progress, about 200,000. That is approximately all.

The Court: Those are all weeklies?

The Witness: No, they are monthlies. The New Yorker is the only weekly magazine we have.

Q. The New Yorker is a weekly, and the others you mentioned are monthlies? A. That is right.

Q. Looking again at Plaintiff's Exhibit 14 for a minute, which shows one of these web perfecting presses on which you used these Vaporin heat-dried inks, do you make any regulation of the amount of heat applied to the paper by the heaters? A. Oh, yes.

Q. How do you regulate that? A. There is a valve (224) there with which you can regulate the amount of heat that is needed. It all depends on the type of paper you are using and the amount of color you desire to carry. If you need more color you have to carry a little more heat on it.

Q. That is, there is more ink on the paper? A. That is right. If you have a minimum of ink on the paper you carry less heat on it.

The Court: That heat is created by gas?

The Witness: Gas.

The Court: Natural gas.

The Witness: No, City gas.

The Court: By City gas?

The Witness: Yes.

Q. Does the speed of the web have anything to do with the amount of the heat? A. Well, it works in conjunction one with the other. The amount of ink you carry plus the speed of the web is the way you adjust the amount of heat.

Q. I suppose in any case you do not use any more heat than you have to to dry the ink on the web? A. That is right; especially in these days.

Mr. Byerly: That is all.

Cross examination by Mr. Free:

Q. You also have rotogravure presses up there? (225) A. No, we do not.

Q. You have worked with them, haven't you? A. I have only worked around them; I haven't worked with them.

Q. How long ago is it that you worked around them? A. Offset—on rotogravure?

Q. Yes. A. Never worked on it.

Q. Do you know anything about it? A. Very little. I have been around plants where they have had them, like in Jersey City. I have been through their plant and talked about them and discussed them, and I understand the principles of them to a certain extent. I do not profess to know little or a lot about them.

Q. You have seen how they work? A. I have seen them—mechanically I have seen not a lot about them. That is too difficult, but I never worked with them.

Q. But you do know that they deposit ink on the web and the web is heated afterwards? A. Yes.

Q. To drive off the solvent; is that right? A. Yes.

Q. Now can you name some very great magazines, from your experience as a printer, which use rotogravure? A. Collier's is using it.

Q. Collier's? A. Crowell. They use a lot of gravure.

Q. How about the relative speed of production between gravure and heat-set ink? A. Yes, I have seen gravure presses run much faster than the present heat-set presses (226), that I am familiar with.

Q. The quality of the modern rotogravure press is pretty high, isn't it? A. Well, that again depends on the nature of the purchaser of it, but I think they do a good job.

Q. In many instances the rotogravure quality is better than the heat-set ink quality, isn't it? A. In many instances their detail, because of the ink or maybe possibly a combination of their etching and the thinness of their ink, that gives them a lot more detail than you get in heat-set or letterpress printing, as I would term it.

Q. How long ago was it that you first saw a rotogravure press in operation as we have been talking about it here? A. Oh, about six or eight years ago.

Q. You have seen it much earlier than that, too, haven't you? A. No sir; not rotogravure, no.

Q. You know gravure presses have been in use for 15 or 20 years? A. Oh, surely, but I have never had occasion to be tied up with them.

The Court: They use heat, too?

The Witness: They use heat afterwards, yes.

Q. The processes of heat-set printing and rotogravure printing are generally about the same, aren't they; that is, the web is heated after it comes off the press? (227) A. Yes. The gravure is heated mostly with hot air.

Q. Yes. Have you ever seen any hot air heaters on heat-set ink? A. Yes, I have. Radio Guide has them in Chicago. As a matter of fact, they have a combination—Radio Guide has a combination of gravure and letter press printing all on the same machines.

Q. They both work at about the same speed; they have to? A. They do, yes; as a matter of fact the magazine is made simultaneously.

Q. Do you know what is in the inks that you are using now with this heat set process? A. What is that?

Q. What is in the inks? Do you know what the solvent is? A. Specifically, no.

Q. Did you ever notice the smell of it? A. Yes.

Q. It smells something like kerosene? A. Well, everybody smells differently. It just smells like a lot of solvents to me.

Q. Can you characterize it? A. There are a lot of inks that have that kerosene smell.

Q. A sort of petroleum oil smell? A. Sometimes a resin oil smell, but you might say kerosene does—it does smell like kerosene also.

Q. What sort of rollers do you use on your presses? A. Rubber.

Q. Rubber rollers? A. Synthetic rubber.

(228) Q. They get pretty hot, don't they? A. No, I do not think they get as hot as the other type. We have perfected in a few units of our presses—you say they get hot. Yes they do, but there is a method of water-cooling the drums, the distributing drums, which we have done on two units, and whether we can do it any more or not remains to be seen.

Q. I am talking just about the ink rollers. Do they get pretty hot? A. The rubber rollers get hot, yes.

Q. Plenty hot, don't they? A. Well, good enough. I do not say they get so hot that they impair the quality.

Q. You start with a cold press, and then as you increase your speed over a long period of time the friction between the rollers and the tack of the ink makes that get pretty hot? A. Well Vaporin ink is not very tacky: It is very loose ink. Nevertheless the rollers get hot. It wouldn't be because of the tack.

Q. How hot do they get? A. That is hard to say.

Q. 145 degrees Fahrenheit? A. That is hard to say—but easily around that. I do not think anybody has ever measured it. I do not think anybody has ever taken the trouble to measure it.

Q. How long have you been using rubber rollers? A. About five years.

(229) Q. Ever since you have had this heat-set? A. No, we tried—we thought we could get along—at that particular time of rubber rollers in the Vaporin field, the manufacturers of rubber rollers weren't sold on the idea that they could make a synthetic rubber roller that would be satisfactory for Vaporin inks, because they did not know enough about Vaporin inks themselves. Of course they had been using them with oil inks, so we did not buy rubber rollers until about a year later when we installed the presses, but we found it was very necessary to do it.

Q. When did you say you left Southgate Press? A. Oh, just around 1917.

Q. What sort of press did they have there? A. They had an old Cotterell there.

Q. Those presses had heaters on them too? A. No, no.

Q. Did you ever have any flat bed presses? A. They never knew what a heater was in those days.

Q. Did you ever have any flat bed presses? A. Where?

Q. At "Modern Priscilla", Southgate? A. Oh, yes; plenty.

Q. Those had heaters on the end? A. Little gas jets, that is all.

Q. And the sheets, after they were printed, passed over the jets? A. Mostly used to take static out of (230) the press.

Q. And they also helped to dry the ink? A. Oh, yes.

Q. Any heat would help dry the ink? A. It would help, unless the ink was bum.

Q. These tympan rollers are treated to repel the ink? A. Yes.

Q. They are not blotters? A. No. They are a manila which is treated with a certain oil in order to repel the ink, as far as they dare go with them.

The Court: Repel ink?

The Witness: Repel. I mean they repel it from transferring. It is a sort of oily surface, you might say. Some use paraffin and different oils which they use—I don't know just what they do use. I know they use a certain kind of paraffin.

Q. Some of them are even sandpaper? A. Well, those are not used as much as travelling tympans, as they are used in high speed presses which attempt to run without heaters. They are a sort of carbon sheet.

(231) The Court: Do any presses run at high speed without tympans or heaters?

The Witness: There are newspaper presses. It all depends on the quality of the printing you are trying to produce.

Q. What connection is there between the Conde Nast Company and the Interchemical Corporation? A. Only they supply us with ink.

Q. You have a contract for ink? A. I do not know whether we still have a contract. We did at one time.

Q. I understand that Dillon, Read financed your corporation at one time? A. That is in the management end of the business.

The Court: What has that got to do with this case?

Mr. Free: It is the same financial control, the I. P. I., the plaintiff here, and the Conde Nast Company, that is all. If he does not know—

The Court: He does not know.

The Witness: I am not in the financial end of this business.

Q. In your many years' experience with presses did you ever have occasion to look into the composition of the inks you used? A. We look into them as far as the raw material we purchase is concerned; otherwise we buy our (232) ink in bulk. We do not go into them from the very inception of them. We will buy certain reds and blues and we blend them all in our plant. In other words, we buy them in bulk. As far as going into the chemical analysis of the ink, why, we have a man in the plant that takes care of that. I do not bother with it.

Q. You buy the ink to fit the paper? A. Naturally.

Q. And the press, and it varies in viscosity from one time of the year to the other? A. Not only from one time of the year to the other but it varies according to the type of sheet or paper you are going to print on, as well as the type of machine you are going to use it on.

Q. What you are interested in is the quality of the printing? A. The net result.

Re-direct examination by Mr. Byerly:

Q. You referred to a gas flame removing static. A. That was on the old flat bed type of press. There is a certain amount of static in the paper that is generated in the sheet as it passes through, many times due to atmospheric conditions, on possibly paper which is green from the mill or dampness like this, and the sheet passing over the gas to a certain extent removes the static which is developing in the sheet passing through the machine.

Q. I do not yet know what you mean by static, what (233) effect does that have on the sheet? A. The static causes the sheets to cling to the press. You could take two sheets of paper with static and hold them up like that and they will stick right together.

Q. I take it that is static electricity? A. Yes.

Q. These little gas burners eliminated that so the sheets do not stick? A. That is right, as well as set the ink to a certain extent, naturally.

Q. When you are using these oil inks on these flat bed presses with these little burners, how long was it before the ink was dry? A. Oh, eight or ten hours.

Q. That is, the drying time was not substantially changed with these little gas burners? A. Not a lot, but naturally it helped it a little bit.

Q. Why didn't you use gravure presses for the New Yorker when you were getting new presses? A. That is their magazine. They know how they want it printed and we have no control over it. I do not think we could sell them the idea of gravure.

Q. They would not be satisfied with the way gravure prints? A. I do not know whether they would or not. They dictate their terms to us, what they want done, and that is our job just to produce it. We do not discuss with them how they shall run their business.

(234) Q. Do you know which is more generally used in printing magazines of large circulation, the ordinary typographic letter press printing or gravure? A. I say it offhand there is more letter press printing done, but I will say gravure is making very fast steps.

The Court: How is Life?

The Witness: Letter press.

Q. How about the Saturday Evening Post? A. That is a letter press job.

Q. And Collier's I think you said use some of each? A. They are using both. They are using them in conjunction one with the other.

Re-cross examination by Mr. Free:

Q. Have you used an offset roll on the second impression cylinder? A. No, and we do not use an oil motion either.

Mr. Free: This being rebuttal, I move to strike it out because there is no connection between it and the ink of the patent in suit. This witness knows nothing about the ink.

The Court: We will reserve judgment until we get to rebuttal.

---

(235) CALVIN DETRICK, resumed the stand.

Direct examination by Mr. Byerly:

Mr. Free: Is this more rebuttal, may I ask Mr. Byerly?

Mr. Byerly: No, I offer this as part of the *prima facie* case, your Honor.

Q. What is your business, Mr. Detrick? A. Manufacturing printing inks.

Q. What concern are you with? A. Finne-Detrick Incorporated.

Q. Do you know Dr. Gessler? A. I do.

Q. Have you know him for some time? A. 25 years or more.

Q. Were you ever with the Manufacturers Printing Ink Company? A. Yes.

Q. When were you with them, Mr. Detrick? A. From about 1929 to 1938.

Q. What was your position with that company? A. Vice-President.

Q. And did you obtain any materials for making inks from Dr. Gessler when you were with the Manufacturers Printing Ink Company? A. I did.

Q. Just what sort of things did you get from Dr. Gessler at that time? A. I got varnishes that were made of nitrocellulose with solvents.

(236) Q. Did you mix pigments in those and make them into inks? A. Yes.

Q. Who was the man in your company, that is, your company at that time, the Manufacturers Printing Ink Company, who did the actual mixing up of the ink? A. Gilbert W. Stratton.

Q. Did the inks which you made from Dr. Gessler's varnishes differ in any way from ordinary printing inks? A. Definitely, inasmuch as they dried with heat, whereas ordinary printing inks did not, that is, dry instantly with heat.

Q. Did you take any of these inks made with these varnishes such as you got from Dr. Gessler to the Kalamazoo Vegetable Parchment Company, in Kalamazoo, Michigan? A. Yes.

Q. Did you introduce the inks to that company, that is, the use of them? A. I did.

Q. I show you some letters which purport to be signed by you and which have been marked in connection with a deposition taken in Kalamazoo as Hayward Exhibit 1, Hayward Exhibit 2, Hayward Exhibit 3, Hayward Exhibit 4, Hayward Exhibit 5, Hayward Exhibit 6 and Hayward Exhibit 8; are these letters which you wrote and signed, Mr. Detrick? A. Yes, all with the exception of two that were signed by Mr. Winchell in my absence, but I (237) dictated the letters.

Q. He was connected with the Manufacturers Printing Ink Company? A. Yes, he was secretary and treasurer.

Q. These letters are dated from December 21st, 1932, to June 2nd, 1933, are they not? A. Yes.

Q. Now, will you, if you need to do so, refresh your recollection from those letters and tell us what you did about introducing this ink at the Kalamazoo Vegetable Parchment Company? A. I first took it up with Mr. Kindelberger, who was then president of the Kalamazoo Vegetable Parchment Company in Parchment, Michigan. He told me they would be very much interested in an ink of that character. After a short space of time I was turned over to Mr. Hayward, who was then vice-president, and I carried on all my work with Mr. Hayward. He asked me to send out samples, which I did not want to do at that time. I told them I would rather be there when the ink was run. They acceded to that. I sent out ink and went out when it was run, went into the pressroom and ran the ink. I think it was on Heinz job.

Q. What kind of a press was that run on, Mr. Detrick? A. It was a rotary press. It may have been a Cotrell, but I am not sure.

Q. Was it a web press, that is, did it print on a (238) web of paper? A. Yes, the paper was taken from the roll and then cut off in sheets.

Q. Did it pass over any kind of a heater after it was printed, the paper that you tested this ink on? A. Yes, it must have, because the sheets came off dry. I want to

correct that statement, that statement before. It was taken from a roll and rewound. They were not cut off in sheets, so it had to go over a heater and dry.

Q. It went over a heater and then was rolled up in a roll again? A. Yes.

Q. Was it dry enough so it did not stick on to itself when you rolled it up again? A. Yes.

Q. As a result of your demonstration out there did your company, Manufacturers Ink Company, receive an order for some of its new printing ink? A. Yes.

Q. Can you recognize the paper which I now show you, which is marked Hayward Exhibit 7? A. Yes.

Q. What is that? A. That was the Heinz yellow, red and blue I mentioned before.

Q. You mean that is what the ink was used for? A. Yes, that was used on that particular job.

Q. But this document here— A. Is an order from the Kalamazoo Vegetable Parchment Paper Company to Manufacturers Printing Ink Company.

Q. It calls for two hundred pounds of ink, does it? (239) A. It calls for 200 pounds of yellow, 65 pounds of blue and 6 pounds of red.

Q. Did you or your company, Manufacturers Printing Ink Company, deliver this ink? A. Yes.

Q. Do you remember the date on which you delivered it? A. It was 1933, May 1933.

Q. Did you sell any more of this ink to the Kalamazoo Vegetable Parchment Company after that? A. No, sir.

Q. Was the ink which you sent out to the Kalamazoo Vegetable Parchment Company made from the varnishes which you obtained from Dr. Gessler? A. Yes.

Q. Did you testify in some other proceeding about this matter some time ago, Mr. Detrick? A. I did, in 1938.

Q. And Mr. Stratton, who was also with your company, testified at that same time, did he not? A. Yes.

Q. Mr. Stratton had personal knowledge of the way the Manufacturers Printing Ink Company's inks were made and what they were made of, did he not? A. He did.

Cross examination by Mr. Free:

Q. That run out at Kalamazoo, Mr. Detrick, was a trial run, wasn't it? A. Yes.

Q. You never got any more orders after that? A. No.

(240) Q. Going back to these varnishes that you say you got from Dr. Gessler, did you ever get any inks from him? A. No, sir.

Q. Just varnishes? A. Varnishes.

Q. Is a varnish an ink? A. No.

Q. It is a long way from an ink, isn't it? A. It has to be formulated into an ink.

Q. And that takes a long time sometimes, doesn't it? A. Sometimes.

Q. And you fit the ink to the press that it is going to go on? A. And the paper stock.

Q. And you vary it from time to time in accordance with the pigments you use? A. That is right.

Q. Mr. Stratton, who I understand worked with you on that, said that Dr. Gessler showed no evidence of any ink knowledge at all when he first came to your company, does that accord with your recollection?

Mr. Byerly: I object to that as misquoting the witness Stratton.

The Court: He has not testified here?

Mr. Byerly: No, he has given a deposition and did not make that particular statement.

The Court: You can ask the witness if that is correct.

Q. At Q46. in the Stratton deposition he was asked:

(241) "Q. Did you ever receive any inks from Dr. Gessler? A. Well, Dr. Gessler did not know anything about ink. He was a dry color man, working for the Zinsser Company. I think I said that." A. That is correct.

Q. How did Dr. Gessler come to you with the problem? Did he tell you what he wanted to do? He said he had var-

nishs, for example, and he wanted some help to make them into inks? A. Dr. Gessler and I have been friends for a good many years, and I guess it was out of friendship that he first brought the subject up with me. He asked me whether I thought an ink of that type would be salable, and I told him yes. He asked me if I would like to work on it with varnishes that he had, and I told him yes. That was when we started.

Q. Then you put Mr. Stratton on the job to help Dr. Gessler because he was a skilled ink chemist? A. Yes, sir.

Q. How long did Stratton work with Dr. Gessler on inks? A. Up until the time that we produced an ink that ran satisfactory on the press, all during which time Dr. Gessler was developing different varnishes.

Q. And Mr. Stratton would take those varnishes and try to make inks out of them? A. Yes.

Q. Over what period of time was that before you first had a usable ink, months, years? A. I would say (242) approximately a year.

Q. And it took Mr. Stratton that long to make an ink out of Dr. Gessler's varnishes? A. No, well, the varnishes were changed from time to time; as we ran into difficulties those difficulties would be overcome.

Q. You tried first one varnish and then another? A. Yes.

Q. And from those Mr. Stratton tried to make an ink? A. Yes.

Q. And after trying first one varnish and then another, it took about a year to get an ink which would work, is that right? A. I believe that is right.

Q. On this Kalamazoo run that you witnessed I think you said that the paper was rewound on a roll, is that right, after printing? A. To the best of my knowledge, yes.

Q. It seemed to me that you were not certain whether the ink had been heated in its course. A. No, I do not know that it was not. It was a long while ago.

Q. You are not sure that heat was used at that time? A. I believe heat must have been used, because it was re-

wound and would have to be dry or it could not have been rewound.

Q. Yes, but you don't know for a fact that heat was used? A. I am pretty sure.

(243) The Court: You are pretty sure it was?

The Witness: I am pretty sure it was, yes.

Q. See if this is in accordance with your knowledge. I heard that you and Mr. Finne and Dr. Gessler had an agreement as to the exploitation of this heat-set ink; was there such an agreement? A. No, there was nothing other than friendship.

Q. Was there any dispute as to who would take out the patent that is here in issue? A. Not that I know of personally, except what Mr. Finne has told me.

Q. Mr. Finne is now a partner of yours?

Mr. Byerly: I move to strike out what Mr. Finne told him.

Mr. Free: He has not told him anything yet.

Q. Mr. Finne is connected with you now, is he? A. Yes.

Q. Is he here in town? A. He is.

Q. He knows the circumstances I inquired about, as far as you know? A. As far as I know.

Mr. Byerly: I would now like to have read into the record the deposition of Mr. Stratton, which has been referred to. I will ask my associate, Mr. Watson, to read the deposition.

Mr. Watson: GILBERT W. STRATTON, produced as a witness on behalf of plaintiff, having been by me, the (244) said Frank M. Harker, as Notary Public, as aforesaid, first duly cautioned and sworn to testify the truth, the whole truth, and nothing but the truth insofar as he should be interrogated, was examined upon oral interrogatories, and he did thereupon depose, testify and say as follows, viz.:

Direct examination by Mr. Watson:

Q1. Will you state your name? A. Gilbert W. Stratton.

Q2. What is your home address, Mr. Stratton? A. 244 East Pearson Street, DeWitt Hotel, Chicago, Illinois.

Q3. What is your occupation? A. Technical Service Manager for Fuchs & Lang Division of General Printing Ink Corporation.

Q4. Where is your office located? A. 120 West Illinois Street, Chicago.

Q5. Were you ever employed by Manufacturers Printing Ink Corporation? A. Yes, I was.

Q6. When, can you say? A. From, I believe it was, October, 1928, up until March 1st of 1938.

Q7. In what capacity were you employed by them? A. Production Manager, Chemist, everything; complete charge of manufacturing and formulating and matching the colors and service work.

(245) Q8. Were you acquainted with Mr. Detrick while you were employed by that company? A. Yes, indeed.

Q9. He was also connected with that company? A. He was a salesman for the same concern.

Q10. Were you also acquainted with Dr. Gessler? A. Dr. Gessler I met with Mr. Detrick.

Q11. Dr. Gessler was then connected with the Zinsser Company, was he not, at that time? A. That is right.

Q12. Did you receive varnishes from the Zinsser Company? A. We did.

Q13. While you were employed by the Manufacturers Printing Ink Corporation? A. Shall I say "I," or "we"? I mean, is it individual testimony? That I received them there for the concern, or——

Q14. What were the facts? Did you personally receive them? A. Yes, the varnishes were brought to me directly.

Q15. I see. What did you do with those Zinsser varnishes, Mr. Stratton? A. I formulated them into printing inks.

Q16. Did you know, while you were employed by Manufacturers Printing Ink Company, that there was a break between that company and the Zinsser Company? A. I did.

(246) Q17. They no longer received varnishes from the Zinsser Company after that break? A. No, I do not believe they did.

Q18. Did you continue to make inks, utilizing the type of varnishes you received from Zinsser after that break? A. Yes.

Q19. How did you do that? A. Through help with a friend of mine who was a chemist for the Keystone Varnish Company. I know they were cellulose vehicles and by a little research, we found out what viscosity Keystone had used and made other vehicles that were just as satisfactory.

Q20. Those other vehicles contained nitrocellulose? A. Yes.

Q21. Did they also contain a solvent? A. I don't quite remember whether there was a solvent. I know we added solvents to them in making inks.

Q22. What solvents did you use? A. Well, the usual plasticizers, which was dibutylphthalate.

Q23. Anything else? A. Butyl carbitol.

Q24. Mr. Stratton, I show you a small slip of paper, which is marked at the lower righthand corner, "Ex. 93 6/22/38" (handing document to the witness), and ask you whether you can identify it? A. Yes. That is a formula that I made up, using the vehicles and made it into a (247) workable ink; in other words, an ink that would run on a printing press.

Q25. This is a formula and ink that you made then? A. Yes. That is my writing.

Q26. Is that formula in your own handwriting? A. Yes, sir.

I offer the formula identified by the witness in evidence.

Mr. Free: It has no connection with this ink, or certainly is not proven. It is some notes that he made that are undecipherable.

The Court: I think the objection is good.

Mr. Watson: (Continuing)

Q27. Mr. Stratton, do you remember shipping to Kalamazoo Vegetable Parchment Company inks containing nitrocellulose and butyl carbitol? A. Yes, I do; a yellow and blue, I believe. I believe there were two colors.

Q28. Were those inks compounded by you? A. They were.

Q29. What vehicle did you use in making those, do you remember? A. You mean what type of vehicle? Do you mean what cellulose vehicle?

Q30. Do you remember the source from which you obtained the vehicle? A. I believe that came from Keystone (248) Varnish. The records of Manufacturers Printing Ink could prove where they came from.

Q31. What type of varnishes were they? A. A cellulose vehicle.

Q32. That is, nitrocellulose and butyl carbitol? A. With plasticizers, I believe; use plain castor oil with it as well as carbitol and dibutylphthalate, with pigments.

Q33. Was this Keystone Varnish Company that you spoke of concerned with furnishing you with the nitrocellulose butyl carbitol varnishes after the break between your company and the Zinsser Company? A. Yes.

By Mr. Watson: That is all.

Cross-examination by Mr. Free:

Q34. In your direct examination I think you said that you used the usual plasticizers in some of these varnishes and inks. A. Well, I——

Q35. Did you mean to include butyl carbitol as one of those plasticizers? A. I did.

Q36. When did you first learn of butyl carbitol as a solvent for ink resins or varnish resins, or similar materials? A. Well, I believe it came out in 1929 through one of these solvent vendors. Whether it was Commercial Solvents or Advance Solvents, I forget; although they had used them. They were commonly known to the trade as (249) solvents for nitrocellulose.

Q37. The source of the butyl carbitol may have been Carbon & Carbide Solvent Corporation? A. It could have been. They are one of the solvent vendors.

Q38. Did you also hear of the cellosolves as solvents for ink resins at about that same time? A. Well, there was quite a list of them at that time. I don't remember just what classification they were in, in what group; but there were many general solvents, butyl lactate, and butyl carbitol. I don't know just which one was used at that time.

Q39. Well, all of them came out about the same time? A. About the same time.

Q40. As far as you know? A. Yes.

Q41. I believe you said, or indicated, on your direct examination, that you matched the solvent, when you began to obtain varnishes from Keystone. How would you go about doing that? A. Well, from the evaporation point.

Q42. Do you know whether or not there were available on the market at about the same time high-boiling petroleum fractions? A. Yes, there were. There were fractionate derivatives of kerosene.

Q43. How would you go about fractionating kerosene to get a petroleum solvent matching butyl carbitol? A. By using other materials with it, such as naphtha, varnaline. (250) You see, all materials in those days were in their infancy. Since that time we know a whole lot more about it.

Q44. And as those new solvents were made available on the market, you, as an ink maker, would try them out and use them if you found them suitable? A. Absolutely. The

main thing is to get the converting point between the solvent and the gum, to get your hardness of film and to get evaporation.

Q45. Now, as I understand it, you received only varnishes from Dr. Gessler; is that right? A. That is correct.

Q46. Did you ever receive any inks from Dr. Gessler? A. Well, Dr. Gessler did not know anything about ink. He was a dry color man, working for the Zinsser Company. I think I said that.

Q47. How did you arrive at the conclusion that Dr. Gessler knew nothing about making inks? A. Why, he presented vehicles to me, to see if I could make an ink that would work.

Q48. And with those vehicles that were presented to you, you succeeded in making an ink? A. I did. I ground pigment into the vehicles and made a workable consistency.

Q49. And in doing so, it was necessary to adjust (251) the vehicle, to obtain proper consistency, was it not? A. Definitely; yes, indeed. We had a lot of cross fire on the vehicles, working on different types, so that it would be more compatible with the pigments.

Q50. These varnishes which you obtained from Dr. Gessler were comparable to what other varnishes; for example, linseed varnish? A. You mean in consistency?

Q51. As to consistency. Go ahead and answer it. A. As to consistency?

Q52. Yes. A. About equivalent to a No. linseed lithovarnish, which would be in the Bureau of Standards in Washington. I believe in that formula that the different designations, "Varnish" are by letters. Mr. Watson showed me one that has an "L"; yes, "L A", "L. T." There were different consistencies of varnish there in that formula.

Q53. How long did it take you to make a workable ink from the varnishes which you understood Mr. Gessler sent? A. Oh, it was quite some time.

Q54. A matter of days or weeks? A. Oh no; many weeks.

Q55. How many different kinds of varnish did you try, approximately? A. You mean samples that were sent over?

Q56. Yes. A. Samples of varnishes?

(252) Q57. Yes. A. Oh, I would say maybe a dozen or more.

Q58. Some of those varnishes that you tried were made up by you, as I understand it? A. No, not of the first varnishes.

(253) *Re-direct examination by Mr. Watson:*

Q71. Mr. Stratton, it is quite customary for ink makers to make changes in the formula for the ink, to obtain proper working consistency, is it not, when different pigments are used? A. Yes, indeed.

Re-cross examination by Mr. Free:

Q72. As a matter of fact, you change the ink from one season on to another? A. We have to. Summer conditions and winter conditions, and high humidity, all of these things alter the inks.

Q73. An ink maker has often been referred to, to my knowledge, as a sort of a "custom tailor". A. That is right.

(254) Q74. He fits the ink to the job? A. It has to be compatible to the paper it is running on and the type of work that you want to obtain. In other words, you cannot take an ink on a bond paper and run it in a news stock. It has to be tailor made to that product.

Mr. Watson:

Q75. By the way, Mr. Stratton, you are testifying here today in response to a subpoena, are you not? A. Yes. I will say I brought it with me.

Mr. Free:

Q76. As a matter of fact, you would have come here today and testified without a subpoena, would you not?

A. I asked for the subpoena, more or less being with a big concern; I thought it would be better for a subpoena than to come down voluntarily. Maybe I was wrong in doing so, but I thought that would be the better way to handle it.

Q77. Do you know that General Printing Ink Corporation is a licensee under the patent here in suit? A. I know nothing about it.

Q78. Fuchs & Lang is a division of the General Printing Ink Corporation? A. Yes, of the General Printing Ink Corporation.

Mr. Watson: I will now offer the testimony of James M. Alden of Kalamazoo, Michigan, which has been (255) placed in the form of a stipulation by the parties. I believe the stipulation should be marked as an exhibit, or would you prefer to have it read?

The Court: I would like to have it read.

Mr. Watson: (Reading.)

Q1. Where do you live, Mr. Alden? A. My home?

Q2. Is it here in Kalamazoo? A. Kalamazoo.

Q3. What is your occupation? A. Manager of the International Printing Ink Company of Kalamazoo.

Q4. Do you ever go to the plant of the Kalamazoo Vegetable Parchment Company in connection with the sale of inks? A. Every day and sometimes more often.

Q5. Did you ever go there and find that they were using a heat-drying ink which you hadn't seen before? A. I did.

Q6. Do you remember when that was? A. I could tell when it was—around about September 16th.

Q7. What year? A. 1933.

Q8. Do you remember while you were out there, whether or not you learned the source from which the Kalamazoo Vegetable Parchment Company obtained the quick drying ink which you saw them using? A. I did.

Q9. Whom did they get it from? A. They got it from the Manufacturers Printing Ink Company of New York.

(256) Q10. Did you, at the plant of the Kalamazoo Vegetable Parchment Company, obtain any samples? A. I did.

Q11. What were these samples? A. They were samples of yellow and blue.

Q12. Were those inks which you saw them using in printing with heat-drying? A. They were.

Q13. And were those inks which they advised you they obtained from the Manufacturers Printing Ink Company? A. Yes, sir.

Q14. When did you get those samples? A. I got those on September 19th.

Q15. What year? A. 1933.

Q16. Did you send those to the manufacturing plant of the International Printing Ink Company? A. I sent the samples to the Battle Creek factory and also to our New York office.

Mr. Free: I would like to move to strike this deposition also. It has no connection with the ink here described. There is no mention of what is in it, and I do not think it adds anything to the case, and it is immaterial and irrelevant.

Mr. Byerly: It will be connected. It shows one of the stages in the movement of this ink, which we have traced from Dr. Gessler to Kalamazoo now through this (256a) gentleman to the International Printing Ink Company, and we shall hear more about it.

The Court: The motion is denied.

---

(257) PAUL O. BLACKMORE, called as a witness on behalf of the plaintiff, being duly sworn, testified as follows:

Mr. Byerly: If your Honor please, this is a continuation of the events in Kalamazoo. This witness is on here from—is it Cincinnati, Mr. Witness?

The Witness: That is right.

Mr. Byerly: And he has reservations on the train this afternoon. Logically he ought to be the third witness, and if it won't inconvenience your Honor I would like to call him out of turn so that he can catch his train.

The Court: Very well.

Direct examination by Mr. Watson:

Q. What is your occupation, Mr. Blackmore? A. I am chief chemist for the Ault & Wiborg Corporation.

Q. Have you a laboratory? A. We do.

Q. Where? A. Located at the site of our factory in Cincinnati, Ohio.

Q. Who is in charge of that laboratory? A. I am.

Q. Has your laboratory anything to do with the making up of formulæ of material or compounds marketed by Ault & Wiborg? A. Yes, it does. All of the formulas of compounds manufactured by Ault & Wiborg originate in (258) the laboratory.

Q. Have you formulated a compound for a nitrocellulose butyl carbitol lacquer? A. We have.

Q. Have you ascertained from your records whether you have sold any such lacquer to the Battle Creek factory of Interchemical Corporation? A. I have.

Q. How much, do you know? A. Approximately 21,000 pounds.

Q. Do you remember the dates during which such lacquers were sold? A. From July of 1936 until November of 1942.

Q. Have you records of such sales? A. I have.

Q. Can you produce the invoices covering such sales? A. I can. These are the invoices (handing to counsel).

Mr. Watson: If your Honor please, I offer them in evidence.

The Court: Let me see them.

(Documents handed to the Court.)

The Court: You offer these in evidence?

Mr. Watson: Yes.

Mr. Free: Your Honor, again I must object. This is rebuttal. This is directed to commercial success. These invoices run into 1942.

The Court: Is there any issue about it?

Mr. Watson: No, your Honor, there is not. My (259) opponent has dwelt at length on cross examination on the alleged failure of the butyl carbitol inks. This evidence will, I submit, prove they were not a failure, they were still being used extensively.

Mr. Free: That is rebuttal.

Mr. Watson: I think that is a direct reply to what might well serve—not well serve, but what might possibly be attempted to be used as a basis for a motion to dismiss at the end of the *prima facie* case. In order to avoid that I am offering the evidence at this time.

The Court: Objection overruled.

Mr. Watson: Thank you, sir.

Now we have agreed that photostatic copies might be substituted for original records. Is that all right, Mr. Free, to use photostats?

Mr. Free: Yes.

(Marked Plaintiff's Exhibit 19.)

Q. I notice, Mr. Blackmore, that the invoices, Plaintiff's Exhibit 19, referred to nitrocellulose lacquer K-484. What does that mean? Is that the way in which it was ordered, or is that a symbol of yours, or what? A. That is a symbol of the International Printing Ink Corporation by which they order the materials from us.

Q. I note also that the invoices contain other symbols, namely, 895-1 and W4608. Can you tell me what those symbols (260) are? A. The 895-1 is a laboratory designa-

tion that was given to the material when it was in the sample stage. The 4608 is the manufacturing symbol that was given to it by the factory when it was placed in commercial production. Those are both Ault & Wiborg numbers.

Q. Is that in accordance with the regular practice of Ault & Wiborg? A. It is.

Q. How do you identify the raw materials from which the formulas or compounds manufactured by your company are made? A. The raw materials for the sake of convenience are given code numbers rather than being called by name.

Q. Do you keep in your laboratory a file of the formulae of the various materials your company manufactures? A. I do.

Q. Can you produce the formula or formulae for the nitrocellulose lacquer having your laboratory code number 895-1 and the manufacturing code number W4608? A. I can.

Mr. Watson: I offer those formulae in evidence as Plaintiff's Exhibit 20.

The Court: Let me see them.

(Documents handed to the Court.)

The Court: That is nitrocellulose?

The Witness: Nitrocellulose.

The Court: Nitrocellulose lacquer?

The Witness: Yes sir.

(261) Mr. Watson: I offer the set of formulae cards in evidence as Plaintiff's Exhibit 20.

(Marked Plaintiff's Exhibit 20.)

Q. Will you please refer to those formulae cards for the moment, Mr. Blackmore. A. I will.

Q. I note that one is entitled "Standard Formula". Will you explain what that is? A. The standard formula

is the master formula from which all subsequent batch cards are taken.

The Court: By "formula cards" you mean the formula for making up the various products?

The Witness: Yes; when an order is received in the factory for any type of material.

Q. On that standard formula what does the code number 2402 mean? A. One-half second nitrocellulose.

Q. The code number 2408? A. One-eighth second nitrocellulose.

Q. The code number 2515? A. Butyl carbitol.

Q. I note that you have also produced three formula cards, marked "Master Formula". Could you explain the significance of those? A. Those master formulas are formulas that are on file in the manufacturing clerical office, and keep the records of any changes that may take place from time to time due to the variation in raw materials.

(262) Q. In those master formula sheets you have on each code number "V2402". What does that refer to? A. That refers to one-half second nitrocellulose.

Q. And likewise code number V2408. A. It refers to one-eighth second nitrocellulose.

Q. And also V2515. A. That refers to butyl carbitol.

Q. How do you identify the containers of these materials at your factory? A. The raw materials generally are identified by both the name of the material and our code number.

Q. What is the practice when a material manufactured by your company is compounded? A. Well, starting from the raw material, the raw material when received is sampled and taken to the analytical laboratory and tested, to determine whether or not it conforms to the specifications we have set up for that raw material. If it does it is so marked and turned over to the factory for their use. The formula cards or batch cards from which the material is manufactured are then issued from these standard or

we would send him samples for color matching when we knew what designs we were going to run.

Q68. Then did you actually order some ink from him? A. Yes, I have a copy of our order here somewhere. On May 26th we ordered 200 pounds of yellow; 65 pounds of blue and 6 pounds of red.

Mr. Watson: I will offer in evidence the order produced by the witness dated May 26th, 1933, addressed to the Manufacturers Printing Ink Corporation, Brooklyn.

(Marked Plaintiff's Exhibit 27.)

Q69. Did you receive the ink which you ordered on May 26, 1933? A. We received a letter on June 2nd advising us that the inks were being shipped on that day and that they should arrive in Kalamazoo on the following Tuesday.

Mr. Watson: I offer in evidence Mr. Detrick's letter of June 2nd, 1933.

(Marked Plaintiff's Exhibit 28.)

(281) Q70. Did you actually receive these inks in Kalamazoo? A. We received the inks some time before June 6th because on that date I telegraphed to Mr. Detrick that we expected to make a trial run on either the following Saturday or Monday.

Q71. When did you actually use these inks? A. We made the trial on the following Monday. I don't know what date that would be; that would be the Monday after June 6th.

Q72. Was that made with a larger heating drum; did you have that on at that time? A. Yes.

Q73. How did the inks work? A. They worked very successfully on that run, I would say.

Q74. Did you continue to use—first, on that first run with the big drum on these Detrick inks, was that commercial in the sense that you actually sold what was printed? A. Yes.

Q75. Did you continue to use these inks from the Manufacturers Printing Ink Company? A. No, on June 23rd Mr. Detrick wrote us confirming a visit that he had at our plant with Mr. Kindleberger on the previous week. At that time he gave Mr. Kindleberger a price on the ink and asking us for information on the volume we would (282) expect to use to see if they could make any better price. I replied to that letter—I was out of town when he called, and I replied to his letter on the 30th of June and told him the result of the tests showed a great deal of promise and I told him at that time we were installing a new press and that we would arrange to put a large copper drum on that press for commercial and regular production. The small press we had experimented on was not the kind of a press we would run a great deal of our difficult work on. I told him we expected to have that press ready to operate in about four weeks and I told him we would then have a good setup for using the ink, and I told him further that it was not possible to give him any estimate of the amount of ink we might consume over the balance of the year because we had to have more experience on the cost and so forth. I also mentioned in that letter a problem that was a serious one, and that is the fact that there is nothing standard in the designs we run, and we have no assurance of continued business of any one company. Consequently we couldn't estimate in any one color the amount we might consume and this incidentally was a serious complication in buying their ink because they were located so far from us.

Q76. Did you later find a source from which you would get a similar ink which was nearer to you? A. Yes, the (283) International Printing Ink Company submitted

samples of an ink, during that summer I would say, probably in August, which seemed to match the ink supplied by the Manufacturers Printing Ink Company in every respect and after we got our new press in operation, we tried out the International Ink and it produced all the results we got with the Manufacturers and we changed over our development program with the International instead of the Manufacturers.

Q77. Did you use up in commercial work the 200 pounds you bought from the Manufacturers Printing Ink Company? A. The test run that we made consumed practically all of the ink and that was shipped on regular order, yes. There was no further run made on that original 200 pounds. The original amount—it was more than 200 pounds.

Q78. I show you what purports to be an invoice—a series of invoices to your company from the International Printing Ink Company for ink, running from December 19, 1933 to January 29, 1936. Did you purchase the ink referred to on those invoices from the International Printing Ink Company? A. We did.

Q79. Did you yesterday have those invoices checked with your records to make sure you had received and paid for all that ink? A. Yes, sir.

Q80. Was that ink dried in the same manner you have (284) been describing, by a heated drum? A. Yes, it was all dried in that way.

Mr. Watson: I will offer in evidence the invoices shown to the witness, and ask that they be marked as a single exhibit.

(Marked Plaintiff's Exhibit 29.)

Q81. I note near the end of Exhibit 9 an invoice dated November 15, 1935, which appears to be for a considerable quantity of a so-called "Q D Varnish." Was that what is sometimes called a vehicle for making ink? A. Yes, sir.

Q82. What did you do with that varnish you obtained from the International Printing Ink Company? A. We found in 1935 that we could produce this heat setting ink, which we called lacquer ink because it contains nitrocellulose—we found we could produce this in our own plant and we started producing it in 1935 ourselves. The International Printing Ink Company had this supply of varnish on hand to take care of our requirements and we purchased the varnish from them and made it up into ink in our own plant.

Q83. And after that did you continue making a similar ink in your own plant? A. We have been making a similar ink to it ever since.

(285) Q84. Then to summarize all this, if I understand you correctly, you have been using a quick drying ink since June 1932? A. No, just a moment. It was June 1933.

Q85. Right, June 1933. You first obtained it from the Manufacturers Printing Ink Company, then from the International Printing Ink Company and then you made it yourself? A. That is correct. I might say that at the end of 1933 we found that the ink was of sufficient value in our operations so we equipped our presses with a ventilating system for removing the fumes of the solvents by ventilation.

Q86. Were all these quick drying inks you used commercially printed on a traveling web on a typographical cylinder? A. Entirely.

Q87. Was this ink more or less expensive than the regular linseed oil ink? A. It has always been more expensive than the regular linseed oil ink. That is the reason we have limited our consumption of it.

Q88. Under what circumstances did you use it commercially? A. We used it on those orders where there is a very rigid odor specification. In other words, where the customer insists that the ink be completely odorless, and then we use it on those orders where the ink coverage is so heavy that the ordinary drying would take too long, and

on those orders which require a very (286) rapid drying, and which do not permit the use of linseed ink.

Q89. What kind of rolls do you use on the presses where you print this ink with ink rolls? A. We use what are known as Ideal Rollers, which is a rubber roller which we coat with a composition to give it a normal surface of an ink roller.

Q90. When you are using linseed inks, how often do you coat those rollers? A. I couldn't tell you exactly. It is just a normal re-coating process. I suppose it would be, perhaps, every three or four weeks.

Q91. How often do you have to re-coat them when you are using these quick drying inks? A. A set of rolls on the quick drying inks will normally run about a week.

Q92. How much does it cost to re-coat these rolls? A. It is a very inexpensive operation. I couldn't tell you the exact amount. I know it is a standard method of re-coating and it is a very inexpensive thing to do.

Q93. Do you know what the vehicle is in the quick drying ink that you use since you started making them yourself? A. I understand it is butyl carbitol.

Q94. There is nitrocellulose also in these inks? A. I understand there is, yes.

(287) Q95. Mr. Hayward, the group of invoices which you have previously identified as Plaintiff's Hayward Exhibit 9 (Ex. 29), seem to cover purchases beginning on December 19, 1933 and ending on February 29, 1936, is that correct? A. Yes, that is right. These are all correct so far as I know.

Q96. These were previously identified? A. Yes.

Q97. I now show you another group of invoices extending apparently from August 12, 1936 through November 18, 1942, and ask you whether or not such invoices show purchases made from the International Printing Ink Company during that period and have been checked. A. These have been checked against our purchases. I did not personally check these, I had Mr. Wood check them.

Q98. Your answer is they have been checked? A. Yes, for both receipts and purchases.

Q99. You have ascertained that the ink referred to in these invoices was purchased and received by you? A. That's right.

Mr. Watson: I offer the group of invoices collectively in evidence.

(Marked Plaintiff's Exhibit 30.)

Q100. Could you tell us, Mr. Hayward, the purposes (288) which the ink covered by the invoices from 1933 to February 29, 1936 were used? A. They were used for printing waxed paper, either for carton wrapping or for bread wrapping.

Q101. And can you tell me the purposes for which the inks covered by the invoices in Plaintiff's Hayward Exhibit 10 (Ex. 30) were used? A. They were used for cartons and for bread wrapping and for imitation cork printing. They were used for printing imitation cork design on paper to be used for cork tipping cigarettes.

Q102. Were the inks covered by these two groups of invoices, Plaintiff's Hayward Exhibit 9 (Ex. 29) and Plaintiff's Hayward Exhibit 10 (Ex. 30), the type which are known as heat-set inks? A. Yes, sir.

Q103. Did you discontinue the use of such ink for printing wax paper? A. Yes.

Q104. Would you explain why, please? A. We discontinued them because the heat applied to the paper caused a variable moisture content in the sheet which in turn varied the working properties of the paper and we found other inks and methods of printing which accomplished the same results without the variable effect upon our paper itself.

Q105. What was the purpose for adopting the heat-set ink in the first place? A. That original experiment (289) was carried out with the hope that we could obtain

lower cost finished printing waxed paper because of the element of the long drying time we had with the oil oxidizing ink. The experiment or attempted work proved that the finished wrappers were more expensive than the use of oil ink with drying time. The quick setting ink had the properties of being completely odorless and so we continued the use on a more limited basis for the printing of those kind of wrappers where we wanted a wrapper that was free of odor and where we were pressed for delivery and had to eliminate the drying time for oil ink and in that kind of an order by the use of these inks we were able to accomplish the desired results. They were discontinued generally because of cost and were used in a limited fashion for emergency drying and for those designs requiring odorless ink.

Q106. Lack of odor is important? A. Lack of odor is important in some specifications. In others it is not so important.

Q107. And by odor you mean the odor characteristic of the old linseed oil varnish? A. That's right.

Q108. Did the heat applied to the printed paper which had been coated or treated in any way with wax have any effect on that wax? A. No. Our problem—I don't know as you want this in the record or not—but (290) our problem with the ink is that we have to vary the speed of the press in order to examine the printing and in varying the speed without being able to vary the temperature our paper will go dry and then become moist again. If we could have held it to one moisture we could have used it.

Q109. Were these inks stable on the press, Mr. Hayward? A. Yes.

Q110. Did they dry immediately on application of heat? A. Yes.

Q111. For what purpose are you now using these so-called heat-set inks? A. We are now using them for printing this artificial cork design for use in tipping cigarettes.

Q112. Then the problem of getting the paper too dry is not encountered in such use? A. It is not encountered so much, that paper is not waxed.

Q113. Did you find that the use of these inks enabled you to speed up the printing operations? A. No, actually our speed of printing was reduced and that was because probably of lack of sufficient area of drying, but actually we ran at a lower speed which partly accounted for the increase in cost and we didn't feel that the result justified adding enough additional equipment to get it back to normal.

(291) Q114. You would have needed other equipment? A. We would have needed more drying equipment and heating equipment to maintain normal speed.

Cross examination by Mr. Free:

XQ1. As I understand it, the problem of odor is of considerable importance to some of your customers? A. To some customers yes, to others it is not. Of course, severe odor would be a problem to any, but the odor that is normal to linseed oil ink is not objectionable to a large volume of our business.

XQ2. I understand in those cases where odor is important that factor was of considerable greater weight than the factor of speed. A. That is correct. Some specifications that had to be free of odor we ran them even though the cost was greater.

XQ3. Have you ever used any so-called heat-set ink which had odor after printing? A. I don't think we have. I could qualify that answer first that we would eliminate all gravure ink which is technically a heat-set ink, but that is all we do use that does carry odor. We eliminate all aniline ink. After elimination of aniline and gravure we are using some ink called Vapo-Set and hy-dry ink. These can technically be called a (292) heat-set ink and they do carry a very minor odor, less than that accompanying ordinary linseed ink.

XQ4. What causes the odor in the ink—the solvent usually, is it not? A. The odor in the linseed oil and other oxidizing oil inks is due to oxidation of oil and that is the cause of that odor.

Now, the odor in a heat-set ink—in the first place, there is not any odor with the heat-setting ink we have used.

XQ5. Which meant that the solvent evaporates altogether? A. That is correct.

XQ6. And is of such a nature as not to have any odor? A. That's right.

XQ7. What is the solvent you have been using in the heat-setting ink we have been talking about? A. The inks have been purchased as compound mixtures and I can't say definitely what the solvent is in them.

XQ8. When you gave your testimony in 1938 in this previous case in answer to question 93, your testimony reads, "Q. Do you know what vehicle is in the quick drying ink which you used since you started making it yourself? A. I understand it is butyl carbitol." A. Yes.

XQ9. I would like to know if butyl carbitol is still a solvent you were using in quick drying ink? A. If we made (293) them always that is what we did use.

XQ10. Have you ever used any other solvent than that in the ink you made yourself? A. I guess not.

XQ11. And now the ink you purchased or obtained from I.P.I., is that a heat-set ink? A. I think that is true.

XQ12. You don't know what is in them now? A. No, I wouldn't know about that.

XQ13. But they are still odorless in the same way they were before? A. Still carry on the same process.

XQ14. I noticed in the previous litigation you purchased some Q.D. varnish from Hilton-Davis Company of Cincinnati for the compounding of some inks, do you remember that? A. Yes, sir.

XQ15. Do you remember what solvent was in that varnish? A. If you want that answer I would have to call the ink department to go into that.

XQ16. Your answer is that you don't know yourself? A. No, I don't know.

XQ17. Have you ever heard of butyl carbitol acetate, a solvent used in heat-set ink in lieu of butyl carbitol? A. It has never been discussed with me as such.

XQ18. You don't know of it? A. No.

XQ19. The reason I ask that question is because one of Hilton-Davis's men told me that the varnish which you had been purchasing from that Company contained butyl (294) carbitol acetate instead of butyl carbitol? A. That I am not familiar with, it has either been sold to us as a varnish or as a direct solvent.

XQ20. I understand one reason why the change was made from butyl carbitol to butyl carbitol acetate was because the acetate was more stable on the press. Do you remember any improvement in the ink after you began making it yourself in that respect? A. I don't recall any definite change. Minor improvements could go on which I might not be familiar with.

XQ21. How much ink do you use in this plant, approximately? A. Total—all types and kinds?

XQ22. Yes. A. In pounds or dollars?

XQ23. Any comparative figure will do. Is it on the order of one thousand pounds a year or one hundred thousand? A. We use sixty or seventy thousand pounds a month.

XQ24. What proportion of that amount is this heat-set ink which you have been buying from I. P. I.? A. Only a fraction of 1%.

XQ25. What proportion of that ink which you use each month is gravure ink approximately? A. Approximately 25%.

XQ26. And the remainder is what? A. Well, the remainder is aniline or oil ink, aniline probably would run I would say 15% and the balance all oil ink.

(295) XQ27. In answer to question 85 in your earlier testimony you stated that at the end of 1933 you began to

equip your presses with a ventilating system for removing the fumes or solvent by ventilation? A. Is that on page 204?

XQ28. Yes. A. Yes.

XQ29. Were you ever present when the ink was being dried on the press at any time? A. Yes.

XQ30. Can you describe the nature of the odor of the solvents used? A. It is a sweet type of odor, if you call that a description.

XQ31. Have you ever been present in the intervening years since 1933 and noticed any change in the odor or fumes in the heat-set ink? A. I have been present. I have not noticed any change. On the other hand, our ventilating equipment is so much better today than it was that the odor is not prevalent in the press room as it was in the early days.

XQ32. Have you ever had occasion to smell the ink in the intervening years and detect any difference in the odor? A. I have not smelled of those inks, no.

XQ33. As I understand it, the printing paper which is to be coated with wax presents a considerable problem to you, especially where heat is used. A. "Considerable" is quite an indefinite thing.

(296) XQ34. Well, answer the question the best you can. A. You are asking me is it a problem to use heat on paper and then subsequently wax it?

XQ35. Yes. A. The problem of drying the ink with heat on the press is not a difficult problem, if you have sufficient heating capacity; neither does the waxing of that paper present any unusual difficulty, but in the operation of the press it is necessary to vary its speed to examine the printing either for coverage or register and when you vary the speed it is not possible to vary the drying heat with it and in consequence the paper at that slow speed gets very dry. Then when you wax that paper, that paper in the roll with the lower moisture content is very brittle and when you put that paper on a wrapping machine which is set up

for a certain standard moisture instead of a certain standard flexibility and when you run into that paper the paper breaks in the wrapping machine.

XQ36. So you are obliged to gait the printing to the waxing to get them working together? A. Yes, you have got to try your best to hold a uniform moisture content in the paper and then to apply heat and moisture and wax and bring them together to get the desired results. If your moisture in the sheet of paper varies, then you can't adjust for it because you (297) don't know where it varies or how much and in consequence you get a variable finished product.

XQ37. Have you ever had occasion to use cooling drums between the printing machine and the waxing machine to restore that moisture balance in the paper? A. We have used cooling rolls for the purpose of setting the ink, but a cooling roll would not restore any appreciable amount of moisture and will not restore a variable amount, depending upon a variable press.

XQ38. Have you ever had any difficulty with the ink bleeding into the wax by reason of waxing before the ink was dry? A. Not to my knowledge with the heat-setting ink.

XQ39. I ask that question because I understand that some of the wax paper people who have used heat-set ink do have that trouble with the wax becoming brittle and flaking off in addition t blurring or bleeding off. You have never had that trouble? A. No, because we have never printed except where we dry the ink. If you had printed using an oil ink, where the ink was not sufficiently dry, you would naturally expect that result.

XQ40. How hot approximately is the drum over which the web passes after being printed with the heat-set ink? A. We use steam pressure in the drum of about ten pounds (298) which would give a temperature of steam about 245 degrees F. That is the temperature of the steam. The temperature of the drum would be a few degrees lower than that on the outside.

XQ41. The drum has to be that hot to touch off the solvent in the ink? A. Yes, in addition to that we have also used flames directly on the printing side sometimes.

XQ42. Haven't you found that to be too hot for Parchment paper? A. Not if the press is running at its normal speed.

XQ43. The first heat-set ink you obtained from the manufacturers was not always stable on the presses, was it? A. Well, if it was not stable it would have been only in the first or second experimental runs. In other words, we tried one lot and it didn't work too well. Then we tried another lot and it worked better and my recollection was that it straightened out in stability rather quickly.

XQ44. How did that lack of stability manifest itself on the press? A. Mostly by drying on the printing rollers.

XQ45. Is that sometimes accompanied by tearing the web? A. Not that I recall, it was in the ink fountain itself.

XQ46. What did you do in that case, clean out the fountain and replace the ink? A. Those were in the (299) experimental stages of it and at the beginning it is my recollection we just cleaned out the whole thing and put it back.

XQ47. You never tried thinning it by more solvent to replace that which had evaporated? A. Not in that stage; we did at a later date.

XQ48. You do that now occasionally too, don't you? A. Yes.

Mr. Free: That is all.

Re-direct examination by Mr. Watson:

Q115. What sort of ink do you use on these bread wrappers or waxed papers, whatever it was, instead of heat-set ink when you abandoned the use of such ink? A. Part of the designs we changed over to aniline ink and in a very few cases we changed some to gravure and in others we changed it to an ink called vapo-set.

Q116. I am not sure whether I understood you correctly or not; did you say that in some cases where you needed especially fast drying ink you used heat-set ink? A. Yes.

Q117. Did you also say that the use of heat-set ink did not increase printing speed over the use of linseed oil ink? A. It didn't increase it, we run slower.

Q118. Why then do you use heat-set ink where you want—(300) where you had to make faster delivery? A. When we use oil oxidizing ink you have to let that paper stand sometimes from one week to ten days in the roll for the ink to oxidize before you can wax it and then the difference in the printing speed is practically nothing in comparison to the time involved for allowing the oxidizing oil ink to have time to oxidize.

Q119. Perhaps I should have said there was a difference in production speed rather than printing speed as between the two inks—speed of producing the finished product? A. Well, in the printing speed those rolls with heat-set ink, the time between when you start to print and when you get the wax on is much shorter than when you use an oil ink.

Mr. Watson: I see, that is all.

Re-cross examination by Mr. Free:

XQ49. I would like to ask you, Mr. Hayward, about the speed of printing with these gravure inks as compared with heat-set, which is faster in your experience? A. On a large gravure press the speed of printing is very much faster, but on a small three-color gravure press where our drying capacity on that press is limited, the speed is no greater than it would be with the heat-set ink.

(301) XQ50. That is because with the gravure ink you dry that also? A. You dry it and you are limited in drying capacity.

XQ51. Then you are all through with gravure ink after you have done drying? A. Yes.

XQ52. How do aniline inks work, are they treated with heat at all? A. The aniline inks, generally speaking, carry a more volatile solvent than any inks, and so they dry with practically no heat. We carry a fan on the surface of the paper and in some instances we have carried an electric infra-red light bulb that has applied a certain amount of heat to the surface.

XQ53. Do the aniline inks leave an odor? A. Not after the solvent is removed. To a large extent it is an alcohol solvent.

XQ54. Do you use aniline printed wrappers for food products? A. Yes, of all types.

XQ55. And wax them afterwards? A. Yes.

XQ56. Mr. Hayward, at my request you have produced the correspondence concerning the heat-set ink proposition you handled with Manufacturers Printing Ink Corporation, is that right? A. Yes.

XQ57. I note among the papers which you show me a memorandum from you dated February 23, 1933 to Mr. Shaffer. At the foot of this memorandum there is a longhand memo (302) signed "C. Shaffer". Do you recognize his handwriting and signature? A. That's right.

XQ58. Did you receive this memo from him? A. Yes.

Mr. Free: I offer in evidence as Defendant's Exhibit D the memo Mr. Hayward just referred to, and I have an original which I would like to substitute for the photostat, your Honor.

(Marked Defendant's Exhibit D.)

A. This definitely identifies this as the original sample of ink they sent us. My letters definitely identify that. They sent us a little can of ink about the size of this glass and from that small sample we made these hand printed proofs and dried them on a hot plate and waxed them by hand and these were our comments.

XQ59. These samples attached to Exhibit A-D (Ex. D) all seem to be the same, don't they? A. Just duplicate samples.

XQ60. I will leave one on and take off the rest. May I take this original for the exhibit? A. That is all right.

Mr. Watson: Then, Mr. Free, you have examined the file produced by Mr. Hayward and offered in evidence only the one report, is that correct?

Mr. Free: That is right.

(Adjourned to January 20, 1943, 10:30 a. m.)

(303) New York, January 20, 1943; 10:30 o'clock a. m.

TRIAL RESUMED.

Mr. Free: Defendant's counsel substitutes original document for photostatic copy of Defendant's Exhibit D.

FRANCIS JACK JEUCK, called as a witness on behalf of the plaintiff, being duly sworn, testified as follows:

Direct examination by Mr. Byerly:

Q. Where do you live? A. Chicago.

Q. What is your present position? A. Manager of the International Printing Ink Company's Chicago factory.

Q. That is a division of the plaintiff, Interchemical Corporation? A. That is correct.

Q. How long have you been with Chicago? A. Approximately three years.

Q. Before that where were you? A. I was in the Battle Creek, Michigan, plant.

Q. What was your position there? A. Manager of the Battle Creek plant of the same company.

The Court: That is the International Printing (304) Ink Company, and that is a subsidiary of the plaintiff?

Mr. Byerly: It is really a division of it. It is really the same corporation, acting under a different name.

Q. How long were you manager of the plaintiff's Battle Creek plant? A. About 14 years.

Q. While you were there did you sell any printing ink containing butyl carbitol to the Kalamazoo Vegetable Parchment Company? A. Yes.

Q. I show you a set of invoices produced by Mr. Hayward of that company and marked Plaintiff's Exhibit 29; do you recognize these invoices? A. Yes, I do.

Q. Are those invoices for ink sold by your company to the Kalamazoo Vegetable Parchment Company? A. That is right.

Q. Is the ink referred to in your invoices, or was the ink referred to in those invoices actually delivered? A. Yes.

Q. What is the period covered by those invoices? A. The period covered by those invoices is from December 19, 1933, to February 29, 1936.

Q. Did you have charge of the manufacture of the ink referred to in those invoices? A. Yes, I did.

Q. I notice the various inks on the invoices are referred to by numbers or symbols; what do they indicate? (305) A. The symbols indicate our formula numbers as they are recorded in the factory, as an identification of each individual formula.

Q. Were the inks which you sold and which were referred to in the invoices, made in accordance with these formulae referred to by numbers? A. That is correct.

Q. Have you made a summary or recapitulation of these invoices? A. Yes.

Q. Is this it? A. This is it.

Q. What is the total quantity of ink covered by these invoices? A. 36,060½ pounds.

Q. What is the total price? A. $20,143.30.

Q. Did you maintain formula books in your office showing the formulae of the inks you manufactured? A. That is correct.

Q. Have you produced here these formula books? A. Yes.

The Court: What do the formula books show?

Mr. Byerly: The composition of these inks that are referred to on the invoices, identified by the same numbers, and, of course, the books themselves contain a number of other inks.

The Court: They show the composition of each particular invoice of ink?

(306) Mr. Byerly: Yes.

Q. Have you made copies of the invoices in your invoice books which relate to the particular inks mentioned on the invoices, Exhibit 29? A. Yes.

Q. Are these the copies of the invoices which I now show you? A. Yes, these are the copies.

Q. Are they correct copies of formulae? A. Correct copies of the formulae that are in the formula books.

Mr. Byerly: To avoid the necessity of offering the entire books, I will offer these copies of the relevant formulas, and ask that they be marked in evidence.

The Court: Is there any objection?

Mr. Free: I do not think it is material. It is cumulative. It does not show very much. Let the witness describe what they are and that ought to be enough.

The Court: If there is no objection they will be admitted.

(Marked Plaintiff's Exhibit 31.)

Q. I notice the first formula in Exhibit 31 is identified as MX-1798, and that this symbol MX-1798 occurs as an ingre-

dient in a number of the other formulae, is that correct? A. Correct.

Q. What was the substance referred to as MX-1798? (307) A. This is a vehicle constructed from butyl carbitol and nitrocellulose that was used as the vehicle ingredient for the formula for the inks—for all of the inks, butyl carbitol and nitrocellulose.

Q. I notice in your actual formula book in which you made the copy which is part of Exhibit 31, the words "butyl carbitol" and "nitrocellulose" occur, is that correct? A. That is correct.

Q. And over the words "butyl carbitol" is written, apparently in pencil, "O-350". What is the significance of that figure? A. When we first started this type of formulation butyl carbitol was at that time first used in any production inks in our plant and it had not been through our routine procedure of serialization. At a later date butyl carbitol was serialized by our Brooklyn laboratory which handles the serialization of raw materials as O-350 and the O-350 was written in longhand there at a later date.

Q. A number of these formulae contained in Exhibit 31 have as an ingredient the symbol O-350. What does that indicate? A. That indicates butyl carbitol.

Q. Then as I understand it all the inks referred to in this invoice, Plaintiff's Exhibit 19, contain butyl carbitol? A. That is correct.

Q. That was the solvent used, was it? A. That was the (308) solvent, yes.

Q. What was the function of the nitrocellulose? A. The nitrocellulose was the solids part of the vehicle. In other words, the vehicle is composed to make any ink of that nature, and you have to have a resin and a solvent, so the nitrocellulose was the resinous part and the butyl carbitol was the solvent part.

Q. Did you ever see these butyl carbitol inks mentioned in the invoices in actual use at the plant of the Kalamazoo Vegetable Parchment Company? A. Yes, innumerable times.

Q. What sort of a printing press or presses were they used on? A. Why, they were run on two and four-color Kidder rotary presses, that is, some of the presses were two-color presses and some of them were four-color Kidder rotary presses.

Q. Those presses printed from a printing cylinder, a rotary cylinder? A. That is right, a rotary cylinder.

Q. They printed on a traveling web of paper? A. Printed on a traveling web.

Q. And did they have the usual ink distribution system, that is, a series of rollers to take the ink out of the tank or fountain or trough, as you call it, and apply it to the printing cylinder? A. That is right.

Q. What happened to the web of paper after it had been printed on? A. After it was printed the web of (309) paper was passed over the hot drum that was heated by steam and in turn there was sufficient heat to vaporize the solvent, and then the web went into a rewind and rolled up again into another roll after it had been through the press and over the heater.

Q. Have you ever seen presses of that type, or perhaps those same presses, used in printing with ordinary linseed oil inks? A. Yes.

Q. What happens to the web in those presses after it is contacted with the printing cylinder when linseed oil inks are used? A. Well, in that particular operation, after the web leaves the printing cylinders it passes over a wax bath which is carried upon a roller and applies a thin film of wax to the back of the sheet, which is then chilled and then it is rewound, with naturally the wax being on the back of the sheet preventing sticking and offset of the ink from the print of the sheet to the back of the succeeding sheet as it is wrapped around.

The Court: And that wax won't expose the ink?

The Witness: No, it won't. As a matter of fact, as the ink dries it dries away from the wax into the

paper and as it becomes a solid film it really releases from the wax and is clean on there because you might say it sticks tighter to the paper than to the wax.

(310) Q. The purpose of the wax film there is to keep the ink from coming off? A. Yes.

Q. Before it gets dry? A. That is right.

Q. Preventing it from coming off the paper? A. Yes, and also to eliminate sticking of the roll together.

The Court: Is that wax very thick?

The Witness: No, it is a comparatively thin film.

The Court: It is absorbed into the paper or stands out?

The Witness: No, it stands out on top. That is the reason for chilling it immediately after it is applied, so it sets that wax right on top of the paper and prevents any excess penetration or absorption.

Q. How long does it take these linseed oil inks to dry when they were on a web of paper that was rolled up this way with wax separating the different turns of the roll? A. Well, it depends entirely on the size of the roll and the amount of ink on the form. By the "amount of ink on the form" I mean whether it is a great big solid coverage of ink or whether it is just some light lines or type printing.

Q. Well, can you give us an idea whether it is a matter of seconds or minutes or hours or days? A. Well, with that type of operation it is all the way from two (311) days to two weeks.

Q. When you saw the butyl carbitol inks which you sold to the Kalamazoo Vegetable Parchment Company used on these presses, was this film of wax used to separate the turns of the roll when the printed matter was rolled up? A. No, that was not used.

The Court: As I understand it the web was run through and printed and then when it was wound up

it would be wound up with this other web of wax paper?

The Witness: No, that is not right. It is the same web but the wax is being applied—the printing is on the front of the paper.

The Court: Wax is on the back of the same paper?

The Witness: And the wax is applied on the back side of the same sheet.

The Court: And then it wound up until it is dry?

The Witness: That is right.

The Court: And then run off again and printed on the other side?

The Witness: No, that is very seldom printed on two sides, work of that type. It is usually waxed and a finished bread wrapper or a carton paper is made out of it.

(312) Q. When these butyl carbitol inks were used on those same presses did they apply this wax to the back of the web? A. No, that was not applied.

Q. What prevented the ink from sticking the turns of the web together when it was rolled up in this roll? A. Because it was dry when it went into the rewind.

Q. It dried as it passed over the steam cylinder to which you have referred? A. That is right. It was completely dry so that the form was dry when it went into the rewind.

Q. How long did it take that ink to dry? A. It was dry in a matter of seconds.

The Court: At what step in the operation was this heat applied, as soon as it came off the roll?

The Witness: Immediately after it comes off the printing cylinder. Then it is carried over a space of two feet over this drum, heating drum, and then within another three or four feet it goes right into the rewind.

The Court: Then it was not dry enough but what you needed the waxing?

The Witness: No, the wax was not used because it was completely dry.

The Court: Oh, I see; just an alternative proposition.

(313) Q. And in this case you say the ink was completely dry when it went into the rewind so it did not blot off from one turn of the rewind onto the other? A. That is correct.

Q. And in that case I suppose the web could be unwound and used right away without waiting a couple of days for drying as you did with the linseed oil? A. It could be immediately.

Q. Were these inks—

The Court: Is that drier used irrespective of the kind of ink you used, that heating?

The Witness: No. The heat was only used with the butyl carbitol-nitrocellulose type inks such as we have referred to. There is no advantage in using it with the other type inks, ordinary type oil inks.

The Court: Why not?

The Witness: Because the heat would have practically no effect on the drying, because the drying took all the way from two days to two weeks and there was no volatile solvent in there to evaporate. They dried completely by oxidation.

The Court: In other words you could not use a heater to dry out the linseed oil, then?

The Witness: It might increase the drying a bit and make the difference in drying maybe, instead of from (314) three days to two weeks, maybe from two days to ten days, something like that; but no material increase in drying.

Q. When did you first see a printing press running with an ink which dried in a matter of a few seconds as dis-

tinguished from several hours or a day? A. Oh, it was some time in the Fall of 1933.

Q. Was it before the date of the first sale mentioned in these invoices, which I think is December 19, 1933? I am referring to the invoices, Plaintiff's Exhibit 29 (handing to witness). A. Yes, I would say it is probably a couple or three months previous to that.

Q. Where was it that you first saw an ink which dried in a few seconds? A. Kalamazoo Vegetable Parchment Company.

Q. Was it being used on a press of the type which you have described? A. That is correct.

Q. Did you show any particular interest in this ink when you first saw it? A. Yes. I was naturally very enthused about it because from the common means of drying ink it was quite a new attack and a bit revolutionary.

Q. Did you get a sample of this ink? A. Yes. We received a sample of the ink I think about a month or six weeks after I initially saw it run.

(315) The Court: How long did they continue to use it?

The Witness: Well, I really couldn't say. I was not in the plant daily but I know that they made a number of runs with the ink, or I assume they did.

The Court: I mean, did they have it as a regular practice?

The Witness: No, I don't think they did at that time. Particularly the run that I saw was experimental.

Q. Did you ascertain from whom or did they tell you from whom they got this ink that dried so quickly? A. I don't believe that I personally knew just at that time whom it was obtained from.

The Court: It was from his company, wasn't it?

Mr. Byerly: No, it was obtained from Mr. Detrick

who testified here yesterday. It was obtained from Mr. Detrick, who testified he obtained ink varnishes from Dr. Gessler and took them out to Kalamazoo and had them tried out there. That was the Manufacturers Printing Ink Company that Mr. Detrick was with, your Honor will remember, and he had no connection whatever with the plaintiff. Of course at that time, your Honor——

The Court: He testified he got an order for the ink.

Mr. Byerly: Yes, he did.

(316) Mr. Free: I think it was 200 pounds and there was no re-order.

Mr. Byerly: That is right.

The Court: And he said he did not get ink from Gessler. He just got some varnishes.

Mr. Byerly: Got the ink varnishes from Dr. Gessler.

The Court: And he made it up.

Mr. Byerly: He and Mr. Stratton put these pigments in the varnishes and made the ink up from Dr. Gessler's varnishes, and took it out to Kalamazoo; when he got out there this witness, Mr. Jeuck, said he saw it running but did not know where it came from.

Mr. Free: You remember Mr. Stratton and Mr. Detrick said it took them several months to make the ink out of the varnish, and that was the same ink.

Q. When you got a sample of this ink did you find out what the ink contained? A. Yes. We were furnished a sample and an additional sample was sent to our New York laboratory and between us we ascertained that the vehicle in the ink was made from butyl carbitol and nitrocellulose.

Q. Did you ascertain that before you made the ink vehicle referred to on the first formula card? A. Yes.

Q. In Exhibit 31? A. Yes.

(317) The Court: I do not know if there is any testimony as to where the butyl carbitol came from. Did Mr. Detrick supply that or did Dr. Gessler supply it to Mr. Detrick?

Mr. Byerly: Dr. Gessler supplied it to Mr. Detrick.

The Court: Well, he got the varnish. Did that include the butyl carbitol?

Mr. Byerly: That included the butyl carbitol.

Q. Mr. Jeuck, when you have what is known as an ink varnish what is necessary to do to make an ink? A. Well, the vehicle is combined with pigments and the selection of pigments depended on the color that you have to match and the body of the ink adjusted so that it fits the particular paper and press on which you have to run it.

The Court: How heavy was this ink? Was it thick or thin?

The Witness: Well, this was quite a viscous ink, of a normal printing ink body.

The Court: What do you mean by "quite viscous"? Quite heavy or light?

The Witness: Well, very molassesy. Would that explain it a bit?

The Court: Yes. It wouldn't run very easy?

The Witness: No.

(318) Q. Is this work of making inks when you are supplied with the so-called ink varnish, a difficult task, Mr. Jeuck? A. I think if you have the normal art and experience of an ink maker, no, it is not difficult—a color matcher and an ink maker.

Q. Is this work of mixing up the pigment and the varnish so as to get the right color and consistency something that was done for the first time when you got these butyl

carbitol and nitrocellulose varnishes? A. No, the same thing is always done with linseed and oxidizing oils.

Q. And this question of mixing the pigment with the vehicle and the adjusting of the consistencies, as I call it, of the ink, is something in which an ink maker has to be skilled, is it not? A. Yes, he has to be skilled and experienced, but it is a normal procedure with most any vehicle that you might use.

Q. Just to illustrate to the Court, I have here a sample of butyl carbitol ink, Plaintiff's Exhibit 10: I do not know whether or not that was the same consistency of what you sold, but perhaps by showing that to the Court you can give him an idea of the consistency of these inks.

The Court: This is Exhibit 10?

Mr. Byerly: Yes.

(319) A. This is the average, normal consistency of an ink of this character.

The Court: That is the condition it is in when it is picked up by the rollers?

The Witness: That is right, once in a while it has to be a little heavier or softer, depending on the sheet of paper, but not a wide variation from that. In an ink like this you would add a little additional solvent, a little butyl carbitol, to make it softer. That would be the normal procedure.

Q. Did you ever receive any solvent known as butyl carbitol acetate at your factory in Battle Creek? A. Yes, we did, and I think that was in about, oh, the latter part of 1936.

The Court: You say you received any or did you make any?

Mr. Byerly: Received any. That is the basic material.

The Witness: You refer to butyl carbitol acetate in that question?

Q. Right. Incidentally, we might perhaps state where you obtained the butyl carbitol which you used in these inks mentioned on Exhibit 29. A. From Carbide & Carbon.

Q. That is, you simply bought it from the Carbide & (320) Carbon Chemical Company? A. That is right.

The Court: Where did you get the formulae?

The Witness: We analyzed the formulae from these samples that we obtained from the Kalamazoo Vegetable Parchment Company.

The Court: You did not get it from your home office?

The Witness: No.

Mr. Free: I object to this line of testimony on the butyl carbitol acetate. That is a different substance from the substance described in the patent in suit. It is immaterial as to whether or not they used butyl carbitol acetate.

The Court: As I understand it, they abandoned butyl carbitol and went over to butyl carbitol acetate.

Mr. Byerly: That is not the fact.

The Court: I thought that was your theory.

Mr. Byerly: No, sir, that is Mr. Free's theory, and it is to meet that that some of this testimony is being put in.

The Court: You are rather anticipating this defense then.

Mr. Free: Yes, sir, all the way through this testimony. That is why I raised the question.

Mr. Byerly: Mr. Free raised the alleged failure (321) of butyl carbitol, as bearing on the question of infringement. I do not think it does.

The Court: You make it clear after I have heard the other side and we are up to rebuttal on that.

Mr. Byerly: What we are trying to bring out, so as not to make this by argument but by facts, is that we are selling butyl carbitol inks today and they are working perfectly, so there has been no abandonment

whatever. I think that bears on the question of infringement probably as well as validity.

The Court: Go ahead.

Q. You said that at your factory in Battle Creek you did get some butyl carbitol acetate, when did you say, about 1936? A. In the Fall of 1936.

Q. Where did you get it from? A. That came from our New York laboratories.

Q. Did you make up some of the inks using butyl carbitol acetate as a solvent? A. Yes, we did.

Q. Did you deliver some samples of those inks to the Kalamazoo Vegetable Parchment Company? A. That is correct.

Q. Did you personally observe and compare the printing operation when carried on with butyl carbitol inks and butyl carbitol acetate inks at the plant of the Kalamazoo Vegetable Parchment Company? A. Yes.

Q. What kind of ink rollers were used in the presses (322) in which you observed these two inks? A. There were two types of rollers used. There were rubber rollers used on some of the equipment and on the other equipment there was what is considered a processed roller, which is a roller that is made with a rubber base and then coated with a thin coating of glue-glycerine roller composition. It gives your printing surface exactly the same type of roller as with a straight, solid glue-glycerine roller.

Q. When you observed the action of these two inks when printed with rubber rollers, what difference did you notice in the two inks? A. No difference.

Q. There was no difference in the stability of the inks on the rollers? A. No.

Q. There was no difference in the speed at which the inks dried? A. No.

Q. There was no difference in the effect of the inks on the rollers? A. That is correct.

Q. When you saw these two inks printed on presses with these rollers that were coated with the glycerine composition, did you notice any difference in the rate at which the two inks dried? A. No difference in the rate at which they dried, no.

The Court: Between the acetate and the butyl carbitol?

(323) Mr. Byerly: Yes.

Q. Did you notice any difference in the stability of the inks, the softness of the inks, on the rollers of the press? A. No.

Q. What, if any, difference did you notice in the action of the ink on the rollers themselves? A. Ordinarily after you ran the butyl carbitol inks approximately a week it would be necessary to recoat the rollers on account of the cracking effect of the butyl carbitol on the glue-glycerine coating, and with the butyl carbitol acetate inks I would say that the rollers would stand up for a period of three weeks, which was quite comparable as the effect with oil inks.

Q. Did you sell any substantial amount of ink containing butyl carbitol acetate as the solvent to the Kalamazoo Vegetable Parchment Company? A. Very, very little, because it was just about that time that they started in their own manufacture of the ink of this type.

The Court: They started to make their own ink?

The Witness: That is right.

The Court: What did they make, an acetate or butyl carbitol?

The Witness: I would not know.

Q. Mr. Hayward referred in his deposition to what (324) he called a Vapo-Set ink, which he said he had used to some extent after he had used these heat-dried inks; is Vapo-Set the name under which an ink is sold by your company? A. That is right.

Q. Are you familiar personally with the making and use of the inks which are called Vapo-Set? A. Yes.

Q. Will you tell us what the inks are made of and how they are used, very briefly? A. Vapo-Set inks are basically constructed with a very hygroscopic solvent. Diethylene glycol is a very important one, in conjunction with a resin, and in all instances to my knowledge a stabilizer has to be added to keep the ink from drying and precipitating on the press due to the hygroscopic properties of the solvent.

Q. How are they dried on the paper? A. They are dried on the paper by either the application of a spray or moisture, or water spray on there, or a spray of steam, and in turn the steam or moisture is taken out by the hygroscopic solvent, and it is diluted to a point where the resin is no longer soluble in the mixture of solvent and water, and the resin precipitates out, leaving a comparatively dry film.

Q. Why is it that this does not occur on the printing rolls of the press when the air in the printing room is moist? A. Because we would normally add stabilizing (325) ingredients to the ink to decrease its moisture sensitivity because without that, the moisture in the air would precipitate the resin out on the press, you could not print in turn.

The Court: Vapo-Set ink restores moisture?

The Witness: Very easily.

The Court: That comes off on the press or is precipitated on that?

The Witness: That combines with the solvent and then after it has absorbed a certain amount of moisture the resin is no longer soluble, and the resin precipitates out and gives you a solid film, dry film.

Q. I am not sure you made clear to the Court why that does not happen on the printing rollers of the press. That is, what you have referred to is the resin coming out in

the use of this ink is something that happens after the ink has been printed on the paper? A. That is right.

Q. Will you state again why the same thing does not happen on the rollers? A. The same thing does not happen on the rollers because we add stabilizing material to the ink, which decrease the water sensitivity of the ink to the moisture in the air and prevents the precipitation of the resin from purely the moisture that it contains or is in the air and that it pulls out of the air.

Q. But a hygroscopic solvent and an ordinary (326) resin alone would make an ink that could not be used? A. To my knowledge it could not.

Q. And that is because it would not be stable on the press? A. That is correct.

Q. Did you ever note any instability of the press in the case of an ink containing butyl carbitol as the solvent? A. No, I have not.

Q. Mr. Hayward also mentioned one other kind of ink which he called an aniline ink; will you tell us very briefly if you know what an aniline ink is and how it is used? A. An aniline ink is a resinous solvent type ink, usually made with very low-boiling solvents. Alcohol is one of the important solvents. It is quite thin in viscosity and watery, and it is applied from a press and printed from a rubber plate, and there is no distributing mechanism on the machine that is similar at all to an ordinary letter press. I think probably an explanation in the layman's language is you may say it is a rotary rubber stamp printing.

Q. Could these aniline inks be used in an ordinary printing press? A. No, they are entirely too volatile.

Cross examination by Mr. Free:

Q. I am not sure I understood you correctly. I think you said, didn't you, that the heat-set ink containing butyl carbitol that you sold over a period of about three (327) years to Kalamazoo was about 30,000 pounds? A. That is correct.

Q. You were sitting here yesterday when Mr. Hayward's testimony was read, were you not? A. That is correct.

Q. Do you remember that one of the questions was something like this—I asked him how many pounds of ink he sold a month and he said, "We use sixty or seventy thousand pounds a month"; do you remember that?

Mr. Byerly: I think this is a matter of argument and not cross examination of this witness, as to what Mr. Hayward said. He is asking him about how many total pounds of ink——

The Court: Mr. Hayward did testify to that.

Mr. Byerly: Yes, but I cannot see that that is cross examination of this witness.

The Court: I think it is proper.

Q. So the amount of ink you sold him over a period of three years was about half his consumption per month, roughly? A. It would be on that basis.

Q. Then I asked him this question, "What proportion of that amount is this heat-set ink which you have been buying from I.P.I.?" And he answered, "Only a fraction of one per cent." Do you remember that? A. That is right.

Q. That is in accordance with your understanding of (328) your sales too? A. That was not in accordance with my understanding of the sales during that period. I think you will find there is a period of possibly a year in here when this type of ink was of a very much greater percentage of the sales, but you are entirely correct that over a period of a number of years in there that that is correct.

Q. Butyl carbitol varnish, as I understand it, is a solution of nitrocellulose in butyl carbitol, isn't it? A. That is right.

Q. Do you know how they make that? A. Yes, we have made a lot of it.

Q. You merely stir in nitrocellulose in butyl carbitol, isn't that right? A. Yes.

Q. There is no trick at all in it? A. Not from a manufacturing standpoint.

Q. You just take the nitrocellulose, put it in the butyl carbitol and stir it? A. It will go in in a period of time and you have a complete solution.

Q. As I understand it, this heat-set ink we have been talking about is substantially like the old varnish ink, excepting that the butyl carbitol-nitrocellulose varnish is substituted for the linseed? A. That is correct, which replaces the linseed or any other drying oils that might have been used as a total vehicle.

(329) Q. And the pigments are the same and all the other elements are the same? A. Basically the same, yes.

Q. You do not mean to tell us that these heat-set inks have entirely replaced linseed varnish inks? A. Absolutely not.

Q. The amount of linseed varnish ink still sold is far in excess of the heat-set ink? A. Yes, I would say it is by far greater proportion.

Q. How much ink is sold per year in the entire industry, have you any idea, all kinds of ink? A. Pounds or dollars and cents?

Q. Or carloads. A. No, I have not.

Q. It is a matter of carloads, isn't it? A. Yes.

Q. Let us take your office, how much ink do you sell a year of all kinds, in pounds or carloads? A. Are you speaking of our individual factory or our factories in general?

Q. Tell me what you know, and identify the factory and company. A. I will identify the factory. The records would be more exact. We will make ten million pounds of ink a year in the Chicago factory, that is, exclusive of news ink.

Q. Why do you exclude that? A. Because it is an entirely different type of ink, made from non-drying oils.

(330) Q. I will ask you the question as to all inks. A. If we were to include that, we will put in another ten million.

Q. What does that amount to in dollars roughly? A. $3,500,000 or $4,000,000.

Q. I think you mentioned gravure inks and, as I understand it, those inks are applied to paper.

Mr. Byerly: If your Honor pleases, this witness did not mention gravure inks, unless I am mistaken, but if Mr. Free wishes to make him his own witness on that subject I have no objection.

The Court: All right.

Q. Did you mention gravure inks at the Kalamazoo Vegetable Parchment Company? A. No.

Q. You know how they work gravure inks? A. I know the principle.

Q. And those inks are applied to the paper and then heat is applied to the paper? A. That is right.

Q. And the solvent evaporates? A. That is correct.

Q. And then when the paper comes off the press the ink is dry? A. That is correct.

Q. And they use that for printing magazines and all sorts of things? A. It is used to a great extent, not to the degree that letter press printing is, though.

The Court: What is letter press printing?

(331) The Witness: Letter press printing is printed from a raised plate and gravure is printed from an etched setup.

The Court: That is the only difference?

The Witness: That is right.

Q. Gravure is sometimes called negative printing and letter press is sometimes called positive printing? A. That is true.

Q. That describes it pretty well? A. Yes.

Q. These glue-glycerine coated rollers, aren't they rubber rollers with a thin coating of glue-glycerine on? A. Yes, they have a rubber base with a thin coating of glue-

glycerine on. As far as the printing surface being affected by ink, it is the same as being solid with glycerine, fundamentally.

Q. It is about 1/16th of an inch thick on the rubber? A. Yes.

Q. They apply that by painting it on? A. There is a special machine that pours it on,—coats it.

---

(332) HERBERT F. SMITH, called as a witness on behalf of the plaintiff, being duly sworn, testified as follows:

Direct examination by Mr. Watson:

Q. Where do you live? A. Battle Creek.

Q. What is your occupation? A. Manager of the Battle Creek factory of International Printing Ink.

Q. How long have you held that position? A. Since 1940.

Q. Previous to that where were you employed? A. Battle Creek.

Q. In what capacity? A. Sales.

Q. Had you anything to do with manufacturing before you became in charge of the factory? A. Assistant to Mr. Jeuck, the witness who just testified.

Q. I show you a group of invoices, Plaintiff's Exhibit 30, which were identified by Mr. Hayward; do you recognize them? A. I do.

Q. What are they? A. They are heat-set ink shipments we made to Kalamazoo Vegetable Parchment Company and were covered by Kalamazoo Vegetable Parchment Company's bona fide orders.

Q. Have you ascertained the total number of pounds of such ink represented by those invoices? A. Yes, I have that. May I refer to it?

(333) Q. Surely. A. 38,579 pounds.

Q. What price was received for those inks? A. $30,115.73.

Q. Can you tell us what period is covered by those invoices? A. Yes, from August 12, 1936 to November 18, 1942.

Q. Those invoices refer to code numbers? A. You mean they are referred to as a code number?

Q. Isn't there a code number mentioned in connection with each? A. That is right.

Q. Can you tell me what those code numbers are? A. They are the identification numbers we have on the formulas that are in those books. After they are copied they are recorded under a number.

Q. Are the inks made in accordance with the formulae referred to by such code numbers? A. Yes.

Q. Can you produce copies of the formulae referred to in these invoices? A. Yes, I can.

Q. You have produced such copies? A. The first one is right here, MX-3858 and MX-3859.

Mr. Watson: I offer these copies in evidence.

(Marked Plaintiff's Exhibit 32.)

The Court: That is a summary of the invoices?

Mr. Watson: No, a copy of the formulae used in compounding these inks.

(334) Q. Would you please refer to these formulae and tell me what code number identifies the varnish used? A. K-484.

Q. What is that varnish, do you know? A. Butyl carbitol and nitrocellulose.

Q. What code number refers to the solvent, if any, used in addition to the varnish? A. O-360.

Q. What is O-360, do you know? A. Butyl carbitol acetate.

Q. Where did you obtain the varnish K-484, Mr. Smith? A. From the Ault & Wiborg Company of Cincinnati.

Q. You personally did not compound that? A. No.

Q. Tell us what you did with it? A. We used K-484 as a vehicle for making these heat-dried inks in the same capacity that we would use linseed oil varnish for making linseed oil inks.

Q. You add to that pigments? A. That is right.

Q. And various compounds and some additional solvent as a thinner? A. That is right.

Q. The additional solvent that you added was the O-360? A. That is right.

Q. You say that is butyl carbitol acetate? A. Yes, sir.

Q. Why did you add butyl carbitol acetate as a thinner, if you were informed that your varnish had butyl carbitol as a solvent? A. We did not have any (335) butyl carbitol. It was not available.

The Court: Was acetate used in all those formulas?

Mr. Watson: No, your Honor. I will bring that out.

Q. I notice that in the first three formulae you have here, namely, MX-3421, MX-3422 and MX-3423, there is no reference to K-484 or to O-360, is that correct? A. That is correct, yes. This was a small shipment of ink made to the Kalamazoo Vegetable Parchment Company for proving purposes.

Q. Can you tell me which invoice those three formulae related to? A. Invoice No. 17,752.

Q. That is for nine pounds of one color? A. 4¾ of another and 4¾ of another one.

Q. For what purpose was that ink used, for proving purposes? A. Yes, in other words, the Kalamazoo Vegetable Parchment Company were asked by their customer to submit proofs of what the finished job would look like. We could not furnish heat-set ink because they did not have any heating unit to dry the heat-set ink on their proving press, so it was necessary for them to use oil base inks in making the proofs.

Q. The initial invoice, the first one in period of time, does not relate to heat-set ink? A. No.

(335a) Q. I notice also that one of these formulae refers to nitrocellulose and O-360 and bears No. M-21773; can you tell me what that is? A. A varnish we made in the Battle Creek factory. It is a cold cut of nitrocellulose with butyl carbitol acetate.

(336) Q. Some of the ink formulae also refer to the No. M-21773, do they not? A. That is right.

Q. That means that the varnish used in inks made in accordance with that formula was the M-21773 type? A. Correct.

Mr. Free: Your Honor, I again object to all this testimony about butyl carbitol acetate. These invoices seem to be all mixed up, some butyl carbitol and some butyl carbitol acetate. That which has to do with butyl carbitol acetate is immaterial and irrelevant here. The patent in suit is butyl carbitol. They have another patent on butyl carbitol acetate which is not in suit here.

Mr. Watson: If counsel will be patient I will connect it up.

The Court: You will what?

Mr. Watson: I say, if counsel will be patient I will connect it up.

The Court: All right. We will rely upon you for that.

Q. Mr. Smith, you heard Mr. Blackmore testify yesterday that the K-484 varnish was made of butyl carbitol and nitrocellulose? A. I did.

Q. He introduced in evidence the formula cards for those varnishes, did he not (handing to witness)? (337) A. Yes, sir.

Q. Have you examined those formula cards and your own formula cards and determined the ratio of butyl car-

bitol to butyl carbitol acetate in the inks covered by the group of invocies, Plaintiff's Exhibit 30?

Mr. Free: I do not believe he knows anything about these Blackmore invoices, and he cannot testify about them.

The Court: If he doesn't know he can say so.

Mr. Free: Have you ever seen these before?

The Witness: I saw them this morning, yes: I heard about them in the testimony yesterday, and in getting the proportion of butyl carbitol and nitrocellulose and butyl carbitol acetate I had some information.

Mr. Free: But you never saw these before and do not know anything about them?

The Witness: Not until I saw them this morning, to get the figures.

Mr. Free: I think it is immaterial, your Honor. What he is doing is comparing something and anyone can do that. It does not help us any.

The Court: Well, it might be interesting.

Mr. Watson: I think it might be somewhat helpful if the ratios could be stated instead of calculated in briefs; I mean, it is all a matter that can be done (338) arithmetically.

The Court: All right.

Q. Can you tell me the range of the ratios?

The Court: What you want to know is which of which and how many of one made up all those 38,000 pounds?

Mr. Watson: All I was going to bring out here was the ratio of butyl carbitol to butyl carbitol acetate in these 38,000 pounds. For instance——

The Court: Well, they are both heat-setting inks, aren't they?

Mr. Watson: Yes, sir.

Q. How many parts of butyl carbitol to one part of butyl carbitol acetate did you determine to be contained in the inks made in accordance with these formulas? A. It ranged from about 4 parts to 30 parts of butyl carbitol to one part of butyl carbitol acetate.

The Court: You mean in the same composition?

The Witness: Yes.

Mr. Watson: That is, it might be made clearer if you will look at these formulae.

The Court: You need not take this down.

(Discusion off the record.)

The Court: All right, go ahead.

Q. Did you find the addition of a small amount of butyl carbitol acetate to these butyl carbitol inks made (339) any difference in their behavior? A. Not at all.

Mr. Watson: All right, Mr. Free.

Cross examination by Mr. Free:

Q. How did you find that out? Print with them? A. Oh, sure.

Q. Still, as I understand it, some of these 30,000 pounds of ink we have been talking about contains a mixture of butyl carbitol and butyl carbitol acetate? A. There was a small percentage of butyl carbitol acetate put in as a thinner. The ink was too heavy a consistency to work well on the press, and we cut it down a little bit with 0-360.

Q. Did that mix well together, butyl carbitol and butyl carbitol acetate? A. Yes, sir.

Mr. Free: That is all.

Mr. Watson: That is all, Mr. Smith.

Mr. Byerly: If your Honor pleases, I will conclude my case by having a portion of a deposition taken

by the plaintiff read. This was given by a user who has used both the plaintiff's and the defendant's inks in his commercial printing.

The Court: We will take a recess of ten minutes.

(Short recess.)

Mr. Watson: If your Honor pleases, I would like (340) to read a portion of the deposition given by Peter Dennerlein, which deposition bears on the question of infringement, reserving the right——

The Court: Isn't this properly rebuttal?

Mr. Watson: No, not on infringement, your Honor.

Mr. Free: This is all commercial success as far as I can make out and is rebuttal.

Mr. Watson: I am confining myself to the portions of the deposition in which he states that his company has used heat-set inks and that such inks have included inks purchased from the defendant.

The balance of the deposition, which relates to commercial success, we should like to offer in rebuttal, reserving the right to offer it in rebuttal if it meets with your approval.

The Court: They used heat-set inks?

Mr. Watson: Yes, sir.

The Court: Of the plaintiff?

Mr. Watson: Yes, sir, and of the defendant.

The Court: All right; proceed.

Extracts read in evidence from deposition of Peter Dennerlein, produced as a witness for plaintiff, who, being first duly sworn, deposed and said:

Direct examination by Mr. Watson:

Q. You are Mr. Peter Dennerlein? A. Yes.

Q. What is your occupation? A. Manufacturing (341) director of Crowell-Collier Publishing Company, Springfield, Ohio plant.

Q. Springfield, Ohio? A. Yes. My residence is 1616 Midvale Road, Springfield, Ohio.

Q. What is the business of the Crowell-Collier Publishing Company? A. Well, publishers of Collier's National Weekly; Woman's Home Companion, and the American Magazine. The main office is at 250 Park Avenue, New York City. Known as the Crowell-Collier Publishing Co. President is Thomas H. Beck; Second Vice-President, Albert E. Winger.

Q. Do they also print those magazines? A. All three magazines are printed in this plant?

Q. Yes? A. We have no other office or no other plant—manufacturing plant.

Q. Would you care to give us the circulation figures of those magazines? A. Yes; Collier's is three millions; Woman's Home Companion four millions and the American Magazine is 2,800,000; Collier's being a weekly and the American Magazine and Woman's Home Companion being monthly magazines. I have been connected with Crowell-Collier Publishing Company since June 29, 1937 in the same occupation; formerly with the McCall Corporation—assistant to W. S. Robinson. Their plant is located in Dayton, Ohio. I was with McCalls from (342) March, 1924 to June 19, 1937.

Mr. Watson: Now, your Honor, I would like to offer page 4, line 14 through the sentence ending in line 9 of page 5.

The Court: All right.

By Mr. Watson:

Q. What kind of ink do you use on your typographic presses? A. On the typographic presses we use two types of ink. One is known as an oil varnish vehicle, and the other a heat flash, or one containing a highly volatile solvent. On the oil type inks we use what is called a tympan sheet which acts as a blotter between the sheet printed on one side while

it comes in contact with the printing plates on the second side. This tympan paper or blotter prevents a major part of the smudging, but it is conducive to licking or taking some of the ink off the sheet after its first impression. This same oil varnish type ink usually takes from six to twelve hours to dry, and if an excessive amount of ink is used in printing it, the ink has a habit of offsetting on to the sheet printed previous or succeeding sheet when they get in contact, whereas the heat flash or solvent type inks either come in contact with a steam drum or pass through a gas oven manufactured by the Selas Manufacturing Co. of Philadelphia (343) and are dried. These flash inks were first used by McCall's some time in 1935 and furnished by the International Printing Ink Co. When I first came to Springfield the International Printing Ink Co. and the Levey Printing Ink Co. both were furnishing this type of heat flash inks.

* * * * * *

Q. These heat flash inks you mention and which you obtained from International Printing Ink Co. were being sold under the trade name of "Vaporin"? A. That is correct.

Q. And you have used them in this plant—throughout your employment here? A. Yes.

Q. And you still are using them? A. Yes.

* * * * * *

(344) Q. Are the heat flash inks that you have used stable on the press—that is, do they dry on the press as it operates or not? A. No, they do not dry on the press while it operates, but they will dry on the press if the press is idle too long with ink left on the rollers.

Q. Yes. A. And we have shut down presses 30 minutes, 45 minutes; in fact an hour without the ink actually drying out.

Q. And are those inks set or dried immediately on the application of heat? A. Oh, yes; they have to be. Yes, sir.

Q. Are you still obtaining inks from I. P. I.—that type of inks? A. Yes.

Q. Have you also obtained such inks from Sinclair & Carroll? A. Yes.

Q. Did they appear to you to be equally stable on the press and equally capable of being set immediately on the application of heat? A. Yes.

* * * * * * *

Cross examination by Mr. Free:

Q. You were buying Sinclair & Carroll inks in 1941? A. Yes, sir. If I remember correctly it was the latter (345) part of 1940. I don't know exactly. I can find it out if you want to know. I can check it.

Q. Not if you don't know about it yourself. A. It was right along in the latter part of 1940,—or '41. In there somewhere.

* * * * * * *

Re-direct examination by Mr. Watson:

Q. You said you purchased Sinclair and Carroll inks in 1940—the latter part of 1940? A. To the best of my recollection.

Q. First purchased then? A. Yes. I am not sure now.

Mr. Free: I object to that. He said he was not sure.

The Witness: I am not sure when we started buying heat-flash or "Vaporin" type inks from Sinclair & Carroll, but early, 1940, '41. Somewhere in there.

Q. You had been using heat-set inks for some time prior to that? A. Yes.

That is all I shall offer at this time, your Honor.

Mr. Byerly: Plaintiff rests.

* * * * * * *

(346) Mr. Free: May it please the Court, ordinarily at the close of the plaintiff's case a motion to dismiss is not in order, but in this instance I make it on the ground that the plaintiff has failed to prove infringement and I say that because the patent in suit is a very specific one. As we remember the claims—and I would like to invite your attention to claim 3 in particular of the patent in suit, states in the last clause, "the major part of the liquid component"—that is at line 32, the first column, and that has reference to the solvent—"having a vapor pressure which at 150 degrees Centigrade approximates that of ethyl alcohol at ordinary temperatures."

Now that clause is substantially the same in all of the remaining claims charged to infringe. What does he mean by that? We have to look at the specification for that, and at the bottom of the first column of page 2 there is a statement that the vapor pressure at 150 degrees of butyl carbitol is 60 (347) millimeters or 6 centimeters, and that the vapor pressure of ethyl alcohol, given at the top of the second column of page 2 is 40 millimeters or 4 centimeters. For my present purposes it is immaterial whether we take 40 or 60, but the claim is very specific in that it says the solvent—and they accuse our 5024 oil here of being the solvent which infringes in the ink—has a vapor pressure which at 150 degrees Centigrade approximates that of ethyl alcohol at ordinary temperature. That means our solvent must have a vapor pressure at 150 degrees which is equal or substantially equal to that of butyl carbitol, namely, 40 millimeters.

Now on Plaintiff's Exhibit 5, which is offered in evidence to indicate the vapor pressure of not

only butyl carbitol but also our 502-C oil, which is the last curve, you will notice that the vapor pressure of 502-C oil at 150 degrees Centigrade is 20 millimeters or 2 centimeters.

The Court: It is below that.

Mr. Free: Yes, about 19, say. That is less than half of ethyl alcohol vapor pressure at room temperature, which is 40. It is only one-third or less of the vapor pressure of butyl carbitol which is 60. The claims call for two points which the accused solvent must meet: First, it must have a vapor pressure at room temperature (348) which is as low as butyl carbitol, and ours is that low, but it also must have a vapor pressure at 150 degrees Centigrade which is at least as high as ethyl alcohol or butyl carbitol—either one. Now those are 40 and 60. It is true he uses the weasel word "approximately", but "approximately" does not mean one-third or one-half.

So I think the motion should be granted on the ground that having failed to prove its one point that it had to prove in its *prima facie* case, namely, that the defendant infringed the patent in suit, the motion should be granted.

The other two points that the plaintiff has been called upon to show here are title to the patent, which we admit, and jurisdiction of this Court which we also admit. Of those three things he has failed to prove the third necessary one, and that is infringement. So I bring this motion under Rule 41(b), which in order to refresh our recollection I might read. It is entitled:

"Involuntary Dismissal: Effect Thereof. For failure of the plaintiff to prosecute or to comply with these rules or any order of court, a defendant may move for dismissal of an action or of any claim against him. After the plaintiff has completed the (349) presentation of his evidence, the defendant,

without waiving his right to offer evidence in the event the motion is not granted, may move for a dismissal on the ground that upon the facts and the law the plaintiff has shown no right to relief. Unless the court in its order for dismissal otherwise specifies, a dismissal under this subdivision and any dismissal not provided for in this rule, other than a dismissal for lack of jurisdiction or for improper venue, operates as an adjudication upon the merits."

Mr. Byerly: I concede, of course, that if we have not proved infringement the case should be dismissed, but I think it has been proved very wholly because the patent expressly uses the word "approximates" with a view to giving a sufficiently definite indication so that anybody can tell what to use in order to get the same results which the patent specifies; and the patent, you will remember, calls attention to a particular class of solvents in which the vapor pressure rises very much when heated above a hundred degrees Centigrade, and then gives ethyl alcohol as illustrating a highly volatile liquid. It mentions its vapor pressure and says that the vapor pressure of the solvent used in the ink at 150 degrees must approximate that of ethyl (350) alcohol, which means, of course, that it must approximate it closely enough for the purposes in question, which purpose is making the ink dry quickly by having the solvent go out of it quickly, just the way ethyl alcohol does.

Now, to illustrate that we showed your Honor an ink which was actually made with ethyl alcohol and which your Honor may remember the witness drew down on a paper, and it dried instantly. We also showed another ink which was made up with a solvent, whose vapor pressure approximated that of ethyl alcohol. That solvent I think had a vapor pressure of about a centimeter and a half, according to the testimony; and your Honor observed that that

dried so quickly that one could scarcely see the difference. In fact, I do not think the difference was distinguishable.

Then in cross examination of Mr. Bragdon reference was made to the vapor pressure of water, which was said to be about a centimeter and a half, and Mr. Bragdon was asked to compare the rate of evaporation of water and ethyl alcohol. He said there was very little difference; they would both evaporate rapidly. In other words, the testimony shows and the patent itself shows that when you get this rapid increase in vapor pressure from an initial vapor pressure (351) at room temperature, amounting to a few hundredths of a millimeter, up to something in the order of a few centimeters, that you have accomplished what the patent specifies; and the only reason that the witness did not say in terms that the vapor pressure of its solvent approximated that of ethyl alcohol was because your Honor properly ruled that they could not use the exact words of the claim. But the testimony brought out very plainly that this solvent of the defendant with a vapor pressure of 150 degrees is about 2 centimeters; defendant's approximates that of ethyl alcohol. In fact, it approximates it just as closely as butyl carbitol does. Butyl carbitol is about 6 centimeters. Ethyl alcohol is about 4 centimeters, and the defendant's is about 2. They are each approximately the same as ethyl alcohol, and so far as the purposes and operations go they act exactly the same. So that any reasonable interpretation of the words in the patent necessarily include defendant's solvent and it would, of course, be permitting a mere evasion of the patent to say that a substance which has a vapor pressure such that it approximates ethyl alcohol and works exactly the same way in the ink as we have shown your Honor, is outside the scope of the claim.

And another point in the patent, which I think (352) is worth noticing, is that the patent indicates pretty clearly what is meant by "approximately", because it contrasts the solvent in question, the particular solvent that he used as an illustration, butyl carbitol, with another liquid called dibutylphthalate, which is used as a plasticizer, and which the patent points out does not evaporate when the ink is heated but merely stays in to soften the binder a little bit. And you will notice in the patent on page 2, lines 10 to 15 of the claim column, he points out that the vapor pressure of diethylene glycol monobutyl ether, which is butyl carbitol, indicates that it will evaporate instantaneously at elevated temperatures like ethyl alcohol at ordinary temperatures. He says that notwithstanding the fact that there is a 2 centimeter difference, as he has pointed out himself, that is, ethyl alcohol is 4 and butyl carbitol is 6. He says those vapor pressures indicate that they evaporate the same way, meaning that they are approximately the same, and then he contrasts that with a plasticizer, such as dibutylphthalate which will evaporate very slowly when heated to 150 degrees. And this Exhibit 5 I think brings that out very strikingly. Your Honor has seen it. But this substance, dibutylphthalate which he says will not evaporate, is down here about one millimeter (353) at 150 degrees. Clearly does not approximate ethyl alcohol. That is very much lower. And I think if this approximates this that all three of those are approximately the same, and the testimony has gone to the point of showing—this next to the last witness pointed out that the butyl carbitol acetate which was used in some of the inks as equivalent to butyl carbitol, that no difference could be observed in the action of the ink on the press. So that in itself shows these little differences between these curves do not make a

difference, and that is clearly within what the patent meant by "approximately".

The Court: The motion to dismiss will be denied, with exception.

DEFENDANT'S PROOFS.

Mr. Free: I would like to offer in evidence as Defendant's Exhibit E file wrapper of the patent in suit, which I offer for the purpose of showing at final argument and in the proofs that the plaintiff is estopped from stretching his claims to include claims previously relinquished, in accordance with the requirements of the Patent Office. And, secondly, to show that these claims are put into the case more than two years after the ink of this patent, butyl carbitol ink, was put in commercial use. Now, in the Muncie-Gear case announced by the Supreme Court not (354) long ago, they held that a claim of that nature was invalid by reason of having been put in too late. I won't go into the Muncie-Gear case now. I simply explain why I put this in as a defendant's exhibit.

(Marked Defendant's Exhibit E.)

Mr. Byerly: I shall not object to the exhibit, but I should like it understood that I do not think the exhibit supports either of those defenses, but, on the contrary, disproves them.

Mr. Free: I would also like to offer in evidence as Defendant's Exhibit F plaintiff's answers to interrogatories, and I offer all of them.

(Deemed marked Defendant's Exhibit F.).

Mr. Free: I might explain that Mr. Byerly and I agreed in behalf of these interrogatories to put the questions and the answers in the same paper so that they can be read more easily.

The Court: How long are they?

Offer of Exhibits.

Mr. Free: They are not very long. Would you like me to read them?

The Court: Yes.

(The interrogatories and answers were read to the Court.)

Mr. Free: I now offer in evidence as Defendant's Exhibit G the book of patents and publications (355) all named in the answer and the amendment to the answer, but this book does not include all of them. This exhibit contains a copy of Lefferts-Stevens patent No. 380,654, a copy of Doughty patent No. 1,439,696——

The Court: Are these all anticipations?

Mr. Free: Yes, I will classify them.

Copy of McElroy and Clarke patent No. 1,450,692.

Copy of Smith patent No. 1,752,462.

Copy of Clewell patent No. 1,806,965.

Copy of Bradley patent No. 1,884,553.

Copy of Lawrence patent No. 1,858,673.

Copy of Lawrence patent No. 1,954,450.

Copy of Jirousek patent No. 1,954,627.

The catalog, that is, the fly-leaf and pages 12 and 13 and the table of physical properties, in the Catalog of Carbide & Carbon Chemicals Corporation, Second Edition, January 1, 1929; a photostat from Industrial and Engineering Chemistry, a publication, issue of April 1931, page 17, entitled "Custom Built Solvents" by Carbide & Carbon Chemicals Corporation; and photostatic copies of pages 9 and 25 of Printing Equipment Engineer, issue of December 1931, entitled "Plastic Printing Inks for Rapid Drying."

In order to classify these patents I offer (356) Lefferts and Stevens, Doughty, McElroy and Clarke, Smith and Jirousek as anticipations. The remainder are offered as indicating the state of the art. I have the original copies of Industrial and Engineering

Chemistry here, if the plaintiff wants to inspect them, but I think we have agreed that photostatic pages can be substituted in each case.

Mr. Byerly: That stipulation is on file.

Mr. Free: One more thing. I have a photostatic copy of the whole catalog of Carbide & Carbon Chemicals Corporation, which is in this book, and the same applies to that, and I would like to ask the plaintiff if he will concede that that catalog has been distributed to the trade in substantial numbers.

Mr. Byerly: Which catalog is that?

Mr. Free: The catalog of the Carbide & Carbon Chemicals Corporation of 1929.

Mr. Byerly: I will concede it was distributed. I have no idea in what numbers.

Mr. Free: I can prove it, but the company said in excess of 1000, if you will take their word for it.

Mr. Byerly: If you will let me check that. I assume it is correct, but I have no information at all about it.

Mr. Free: Well, all right, let me know about (357) that.

(Marked Defendant's Exhibit G.)

Mr. Byerly: If your Honor pleases, I notice that he has added one patent to those which were set up in his bill of particulars as the patents on which he was to rely.

The Court: For anticipation.

Mr. Free: State of the art. I can offer it separately. It is part of the file wrapper, but I think I would like to have them all in that book.

Mr. Byerly: There is no objection. I just did not have a copy here.

Mr. Free: All the anticipation patents are set up in the answer and the bill of particulars.

(358) CLINTON TAYLOR, called as a witness on behalf of the defendant, being duly sworn, testified as follows:

Direct examination by Mr. Free:

Q. What is your occupation? A. Chemist.

Q. With what company? A. Hilton Davis Chemical Company.

Q. That is at Cincinnati, Ohio? A. That is correct.

Q. Prior to that you were in school? A. That is correct.

Q. Where did you study? A. At the University of Cincinnati.

Q. Chemical engineering and chemistry? A. General chemistry.

Q. Ever since that time you have been with the Hilton Davis Company? A. As soon as I left school I joined the Hilton Davis Company.

Q. What connection if any have you had with printing inks? A. The Hilton Davis Chemical Company is a consultant chemist for printing ink manufacturers, and my work for the past 16 years has been in a consulting capacity for printing ink manufacturers, printers and allied industries.

Q. In the course of that work you had occasion to examine and compound printing inks, have you not? A. I have.

Q. You are familiar with the ingredients that go into (359) them? A. I am.

The Court: How long have you been out of school?

The Witness: 16 years. In 1926 I joined the Hilton Davis Chemical Company.

Q. During how much of that time have you been working on printing inks? A. I never left the work of printing inks; that is, we are called in by different printing ink manufacturers on consulting work, and I have always some

type of problem ahead of me on printing ink, compounding printing ink, varnish or some allied type of product.

Q. You have read the patent in suit, have you not? A. I have.

Q. Will you please take it and discuss it, explaining it to the Court, as one skilled in the art. A. The patent No. 2,087,190 of Mr. Gessler states in the first paragraph as follows:

> "The present invention relates to printing inks and has for an object the preparation of a novel type of printing ink, which possesses many advantages over the printing inks heretofore known and overcomes many of the disadvantages associated with the procedure which it has been necessary to use in order that such inks may be properly applied to produce a satisfactory print."

(360) Mr. Byerly: I object to this witness reading the patent or interpreting it. It seems to me that if there are any technical terms that are in any way obscure he has the right to explain those to your Honor, but clearly the interpretation of the patent is a matter for the Court, and it seems to me if parts of it should be read counsel should read them to your Honor, but I object to the witness reading this patent or expressing his own interpretation of it.

Mr. Free: He is not going to interpret anything. He is merely reading the patent and explaining such parts as need explanation.

The Court: Suppose you read to him such parts, and ask him what that means. He cannot take over the job of the Court, much as I would like to have him.

Mr. Free: I am not asking him to. I want him merely to explain some of the things that are in the patent.

The Court: You point out what you want him to explain.

Q. Now in line 41 in the first column, it is stated:

"It has also been proposed to use various types of lacquer in printing processes, particularly cellulose lacquers. As is well known, the cellulose solvents used in these lacquers are characterized by a high degree of volatility."

(361) Q. Are you familiar with such lacquers? A. I am.

Q. What are they usually composed of? A. Of nitrocellulose and volatile solvents, a pigment and a plasticizer.

Q. The volatile solvent is the solvent for the resin, is it not? A. For the resin.

Q. Like nitrocellulose? A. Like nitrocellulose.

Q. You mix them up and make your varnish that way? A. That is correct.

Q. Then you put in the plasticizer—tell us again what the plasticizer is supposed to do? A. When we dissolve nitrocellulose in a volatile substance such as ether and alcohol, and allow it to evaporate, then we will have a thin glass-like film, which, if spread on a piece of paper, and if the paper were to be creased, would just snap off like so much glass. If we add to that a small amount of castor oil, or dibutylphthalate, this plasticizer will remain in the nitrocellulose after the solvent has evaporated, and then this evaporated film may be bent and becomes rubber-like, and that is the sole purpose of a plasticizer.

Q. The plasticizer, in other words, is not the solvent? That stays in the film even after the solvent is evaporated? A. The plasticizer is the material that remains with the resin or the nitrocellulose and (362) gives it its rubbery-like characteristics. It can be illustrated even better with rosin. We all know if we dissolve rosin in a volatile solvent and spread it on a piece of glass, after the solvent has gone the rosin is very dry and brittle, and if we add to that a

small amount of, let us say linseed oil, and then brush on this type of lacquer containing volatile solvent, rosin and linseed oil, after the solvent is dry we then have a true film that can be scraped off with a ribbonlike characteristic and can be stretched and bent; whereas with a resin it would be impossible to do this, and it is common practice in all lacquers where you have a solvent and a resin to add a plasticizer to give this rubberlike effect to the resin.

Q. How long has that been in practice? A. That was in practice with the Duco lacquers, of course, in the 1920s. It was common practice—oh, I will have to stop there. It is a common practice to add an oil with a resin to give a true film.

Q. The pigment, that is mixed in the varnish, what happens to that when the solvent evaporates in these lacquer-type inks you are talking about, either inks or paints? They are both the same. A. Either inks or paints or lacquers are compounds in practically and basically the same way. If we stir, for example, this resin with (363) alcohol —say we take plain alcohol and resin and stir in a little pigment, such as carbon black, which is soot, we will have a black varnish. If we allow that to dry we will only have a black pigment and the resin remaining. If we had a little plasticizer in there we have the complete paint or lacquer or ink. The volatile solvent is evaporated. We have left as a film a pigment bound onto the surface by a plastic resinous film. The plastic and the resin merely bind the pigment to the surface.

Q. How would you compare these volatile inks with the volatile lacquers you have been talking about?

Mr. Byerly: I object to that. It seems to me the question should be a little more specific. No volatile inks have been mentioned.

The Court: We want to go into the whole theory that is vital to this case.

Q. An ink in general is a surface covering, is it not? A. It is.

Q. And as in all these volatile inks, ink is applied to the paper and the solvent is evaporated.

Mr. Byerly: I object to that. There has been no mention in the patent of volatile inks as far as I know, and the witness has been talking about lacquers. What all these volatile inks mean I don't know.

Mr. Free: I am still talking about that section (364) of the patent which I read to him, which says,

"As is well known, the cellulose solvents used in these lacquers is characterized by a high degree of volatility."

Q. Will you look at the second column, about the third line of page 1, where he says:

"I have discovered, however, that if in contrast to the above, cellulose compounds, particularly nitrocellulose, are dissolved in solvents with high boiling points, this difficulty may be avoided."

That is the difficulty of rapid evaporation, and I now refer you to the catalog of Carbide and Chemical Company, which is in the answer book, pages 12 and 13. I will read the statement on page 13 describing butyl carbitol.

"Butyl Carbitol is the monobutyl ether of Diethylene Glycol. This compound possesses a mild odor, is soluble in water and is an excellent solvent for nitrocellulose and resins. As indicated by its boiling point, butyl carbitol is intermediate between the 'high boiling' nitrocellulose solvents and the plasticizers. In consequence it is especially useful in pyroxylin dopes and other plastics where a solvent with an extremely low rate of evaporation is required."

(365) Now I want to ask you whether the solution there described, namely, of butyl carbitol and nitrocellulose, will give you a varnish which has a low rate of evaporation, as

described in the patent? A. That is exactly the same type of varnish described in the patent.

Q. In making up the varnish as is described in this catalog, 1929 catalog, what would you do to make the varnish as thick as you like?

Mr. Byerly: I object to that, your Honor. The catalog, if I read it correctly, does not describe making up any varnish.

Mr. Free: He just said the solution of butyl carbitol and nitrocellulose makes a varnish.

Mr. Byerly: The witness said that, but the catalog does not. Does your Honor have the catalog there? It simply describes the solvent, and says what it can be used for, but it does not describe the varnish.

The Court: That is right.

Mr. Free: All right, then I will strike the question.

Q. In making up the solution of butyl carbitol and nitrocellulose as described in this publication, how would you go about making a varnish that was thick?

Mr. Byerly: Your Honor, that seems to me the (366) same question. He puts in "as described".

The Court: It is the same question in another way.

Mr. Free: All right.

Q. Suppose you mixed butyl carbitol and nitrocellulose as described in this catalog, what would you get?

Mr. Byerly: He still has "described in this catalog".

A. You would get pyroxylin dope.

The Court: He did not say that, did he?

Mr. Free: It states here that this compound is "an excellent solvent for nitrocellulose and resins", and I am asking him what he would get if he made a

solution of those two, nitrocellulose and butyl carbitol, and he said a varnish.

The Court: All right, let it go. I think we will adjourn at this point until 2 o'clock.

(Recess to 2 p.m.)

(367) AFTERNOON SESSION

CLINTON TAYLOR resumed the stand.

Direct examination resumed by Mr. Free:

Q. Still referring to the patent in suit, Mr. Taylor, at the end of the second column of the first page, line 54, the patentee, after describing his solvents, that is describing a group of solvents, says:

> "Among this peculiar class of solvents I have found as an example diethylene glycol monobutyl ether to be a solvent for nitrocellulose and many natural and artificial gums, very well adapted to the purposes of this invention."

I ask you again to refer to the catalog which we were talking about, the 1929 catalog of Carbon and Carbide Chemical, page 13——

> The Court: Where are these pages numbered?
> Mr. Free: At the bottom, your Honor (indicating).
> The Court: Oh yes.

Q. —and ask you whether you find on page 13 a statement anything like that I have just read?

> Mr. Byerly: I object to that, your Honor. The question whether statements are similar or dissimilar is clearly for your Honor.

The Court: I do not see any probative value to that at all.

(368) Mr. Free: I merely ask him whether he finds that statement.

Mr. Byerly: I object to that, your Honor.

The Court: He may answer yes or no.

A. Yes.

Q. Now in the latter part of the statement in the catalog is this sentence:

> "In consequence it"—butyl carbitol—"is especially useful in pyroxylin dopes and other plastics where a solvent with an extremely low rate of evaporation is required."

Then I would like to ask you what you understand to be the meaning of pyroxylin dopes? A. Pyroxylin dope is a solution of nitrocellulose in a solvent with a plasticizer. The name was commonly given to dopes used during the first world war for coating airplane wings. It is a type of pyroxylin varnish with plasticizer solvent and nitrocellulose.

Q. What is pyroxylin? A. Pyroxylin is nitrocellulose—first I should explain what nitrocellulose is. We take ordinary cotton and treat it with nitric acid and sulphuric acid for a certain period of time. A reaction takes place which gives this cotton a new property. It becomes soluble. This treated cotton becomes soluble in such solvents as ether and alcohol, amyl acetate, and of (369) course butyl carbitol and similar solvents that we have been mentioning. Nitrocellulose, as a complete group, is divided into two parts. The completely reacted cotton is called "gun cotton." Now to differentiate between gun cotton and the industrial nitrocellulose, used in lacquers, we call the latter pyroxylin. We call this pyroxylin, and that immediately means those nitrocelluloses which may be used in lacquers, collodion and all of the common industrial type of nitrocelluloses, as differentiated from gun cotton.

Q. State whether or not this pyroxylin dope is a sort of varnish?

Mr. Byerly: I object to that, your Honor. That is purely a question of opinion. He says it is used for covering airplane wings, or protecting them. That gives your Honor the information, but I think this juggling of words in trying to express opinions as to whether things are similar is—

The Court: What is the question?

(Question read.)

The Court: Objection sustained.

Mr. Free: Just to save time I would like to note on the record, your Honor, that in this same catalog, 1929, Carbon & Carbide Chemicals, there is a table of physical properties, and in the first line—

(370) The Court: At what page is that?

Mr. Free: Right here (indicating)—and in the first line butyl carbitol is listed; in about the fourth column the boiling point is given at about 220 degrees Centigrade, and in the second from the last column its vapor pressure at 20 degrees Centigrade is given as .05 millimeters of mercury.

Q. Now, Mr. Taylor, will you take up the Lefferts and Stevens patent——

Mr. Free: Which is the first one in the book, your Honor, in chronological order.

Mr. Byerly: If your Honor pleases, it seems to me that the witness should not present an argument as to this patent. If they are not comprehensible to your Honor he may define the terms, but he is given a patent and asked to take it up. I presume that means to present an argument about it. Now this patent is before your Honor and speaks for itself, and if there is anything obscure in the way

of technical terms I am sure the witness can explain it, but I think it is incompetent for him to present an argument which has a bearing on the case, or anything like that.

Mr. Free: I haven't asked him a question.

Mr. Byerly: He said "Will you take up".

The Court: You have no knowledge of what he is (371) going to ask. It depends on the question.

Mr. Byerly: All right, then I withdraw the objection.

The Court: Is this going to the question of anticipation?

Mr. Free: I beg your pardon, sir?

The Court: Are these patents offered on the question of anticipation?

Mr. Free: Yes. Those are all in the answer.

Q. On the first page of that patent, line 10, it is stated that "Our invention relates to an improved ink for use in the process of printing upon celluloid and other solid pyroxylin compounds". Give us some examples of what common pyroxylin compounds you know of.

Mr. Byerly: Your Honor, I object to that unless it is limited to the date of this patent. The patent is dated in 1888. What common pyroxylin compounds were at that time may be relevant, but certainly what happened later is not.

The Court: Do you know anything about it at that time, in 1888?

The Witness: Yes sir.

The Court: You may answer.

A. The common pyroxylin compounds of this date—— (372) Q. 1888? A. 1888—were the well known celluloid compounds made of low viscosity or pyroxylin type nitrocellulose, a plasticizer such as camphor and used, as we know, for combs, cards, calendars, all types of advertising mediums, and of course needed to be printed upon.

Q. How do some of those old pyroxylin compounds you have reference to compare, to modern articles of trade for example? A. Pyroxylin has not changed. They may have found new uses for them, but they are still nitrocellulose and plasticizer.

Q. Can you name some of the commercial articles which are similar? A. Well, a most common one is lacquered cellophane, which has a coating of pyroxylin lacquer over it to make it waterproof.

Q. And that is printed on, too, nowadays, isn't it? A. It is a common practice to print on moisture proof cellophane.

Q. The patent in suit, at line 38, second column of page 2, refers to "lacquered surfaces of Cellophane", and I would like to have you state whether or not that is comparable to the surfaces referred to by Lefferts and Stevens.

Mr. Byerly: I object to that, your Honor. He may tell what both surfaces are, but I object to his answering a vague opinion question as to "comparable".

(373) The Court: Objection sustained.

Q. Well are they the same surfaces, or are they not? A. The lacquered moisture-proof cellophane has the same type of surface which Lefferts and Stevens speak of.

Q. Now in printing on the lacquered surface of cellophane, or some other surface like pyroxylin, as Lefferts referred to, you have a condition of lack of porosity, do you not, to contend with? A. That is correct.

Q. And that is stated to be the case by Lefferts in line 13 of the first column, is it not?

Mr. Byerly: Which page?

Mr. Free: The first page.

Q. It states there "As this material is of a hard solid and non-porous nature, ordinary printing-ink is unfit for this purpose". Is that right? A. Yes.

Q. Now that presents, from your experience as one skilled in printing ink—would you say that it is difficult to print on lacquered surfaces like cellophane? A. It is very difficult.

Q. More difficult than on paper? A. Very much more.

Q. Is it fair to say that an ink which will print on cellophane will also print on paper? A. It will.

Q. It is an easier job to print on paper? A. Very much.

Q. Now at the top of the second column of the Lefferts patent, page 1, it is stated, in about line 52:

> (374) "The ingredients entering into the compound"—that is the ink he is talking about—"are: First, a solvent or a mixture which is a solvent of pyroxyline; second, a pigment or coloring material in powdered form; third, a gum, gums, or binding agent for holding the particles of pigment together."

I ask you whether that describes a conventional printing ink or not; that is, the ingredients? A. It does, the ingredients.

Q. Down on line 15 of page 2 he describes the kind of solvents he is talking about:

> "The office or function of the solvent is to penetrate the material and serve as a vehicle for carrying the color and fastening it on or to the surface thereof."

I ask you whether that describes the usual function of solvent vehicles used in inks? A. In a certain sense, yes.

Q. Then he goes on to say, in line 18:

> "With regard to the liquid menstrua which might be used, it is desirable that they be of a low volatility."

The Court: What does "menstrua" mean?

Mr. Free: The solvent, the vehicle in which the resin is dissolved.

(375) Q. (Continuing) Now what do you understand to be the meaning of the term "low volatility" as applied to solvents for printing inks, particular nitrocellulose types?

Mr. Byerly: I object to that, your Honor, unless it relates to the year 1888. Of course a good deal more is known about those now than at that time, if he is explaining the patent.

The Court: The witness must confine himself to the state of the art at the time of the patent, 1888.

Mr. Free: We are reading from the patent of 1888, and I merely asked him what he understood the expression to mean "low volatility" as applied to the patent.

The Court: How does he know what the term meant in 1888.

Mr. Free: I take it it means the same thing. It is a publication——

The Court: You haven't asked him that. Ask him.

Q. Does that term, "low volatility", mean to you what is commonly understood to be the meaning of that term today?

Mr. Byerly: I object to that, your Honor. The question is what the patentee meant in 1888, and what the term "low volatility" indicates to this witness today seems to me is entirely irrelevant.

(376) The Court: What did that term mean to a chemist back in 1888; do you know?

The Witness: Yes sir. It——

The Court: How do you know?

The Witness: Well, your Honor, if you are going to work at room temperature with these oils——

The Court: No, I mean how do you know what that meant back in 1888, what this patentee meant when he used that term 50 years ago or 60 years ago.

The Witness: That is explained on his first page, which we did not read, line 35—I think it is in there.

Mr. Free: No. It is down at the bottom of page 2, the first column, line 62:

"As above stated, it is desirable"——

The Witness: Yes, that explains it.

Mr. Free: "As above stated, it is desirable that the substances used for this office"—that is the solvent—"be of a slow-drying nature by virtue of which property they will keep the ink in a moist condition for a long time, producing an action somewhat similar to that of linseed-oil used in the preparation of common engraving or printing ink."

Now on page 2, line 33, he lists a series of (377) solvents, and I asked you whether those solvents fulfilled those qualifications; that is, low volatility and slow drying so as to stay moist a long time. A. These oils have all the properties that are given, low volatility and workability at room temperature; that is, the solvents for pyroxylin, yes—and they have all bodies which when pyroxylin is dissolved in them make it possible to make a printing ink out of them.

Q. If you were to make a printing ink out of them, as instructed in this patent, how would you go about mixing the solvents and the nitrocellulose to get the proper viscosity? A. Well that is quite simple. You take a portion of the solvent, and, we will say for example, a pint of the solvent, and dissolve in it a few ounces of pyroxylin, and if the body is too thin just simply add a little more pyroxylin, stir it into solution and when you get a body equal to linseed oil then you proceed and use that in making an ink.

Q. In order to get the ink thicker you use more pyroxylin? A. You use more pyroxylin.

Q. In order to get a thinner one you use less? A. That is correct.

Q. Or more solvent? A. Yes.

Q. Now what does he say about plasticizers in order (378) to get the proper condition of the film after drying? Do you find any reference to a plasticizer in the patent? A. Yes. He says castor oil may be added to assist in the operations, with gums as a binder. Castor oil is a common plasticizer.

Q. That is referred to in line 11 of the first column of page 2? A. Yes.

Q. Now as to the properties of this ink, he says on page 2, line 70:

> "Our improved ink, produced as above described, possesses many advantages over those heretofore compounded for use on pyroxyline material, its chief and most important characteristic being that that portion which remains on the surface of the material is capable of being so hardened or baked as to resist a great amount of rubbing without being defaced. In using this ink for printing from engraved plates we prefer to employ heat and pressure, which are applied to the plate and material, the effect being that the ink partially penetrates the surface of the material, while that portion remaining on the surface is baked or hardened, so as to form a hard durable surface. This property of the ink distinguishes it from all other mixtures or inks of which we know."

(379) I would like to ask you whether you have tried out an ink like that, as described in this patent, and found that to be so or not? A. I made such an ink and found that it did dry when heated, printed very well and had all those properties.

Q. Now I wonder if you could show us an ink made up in accordance with this patent, and demonstrate how it works with heat? A. I have such an ink here.

Mr. Free: Your Honor, it will take a minute or two to have the heater set up.

Q. You have produced a small container of ink made up in accordance with the Lefferts and Stevens patent? A. I have an ink here in accordance with the Lefferts and Stevens patent.

Q. Will you please describe what the ingredients are and how you mixed them up? A. The ingredients are oil of cassia——

Mr. Free: Just for the record, "oil of cassia" is referred to in line 34 of page 2 of the Lefferts and Stevens patent, and elsewhere.

A. (Continuing) One-half second nitrocellulose, which is a low viscosity nitrocellulose——

Q. Is that the same as pyroxylin referred to in the patent? A. That is the same as pyroxylin—and castor oil as a plasticizer.

(380) Q. That is refetred to in line 11 on page 2 of the patent? A. And chrome yellow as a pigment.

Q. How did you happen to select yellow as a color? A. I selected that because that is the same pigment that Gessler used in his ink, and I have also, as a comparative ink, an ink made exactly on the Gessler formula, chrome yellow 100 parts; one-half second nitrocellulose 35 parts; butyl carbitol 55 parts; dibutylphthalate 10 parts, and blown castor oil 10 parts.

Mr. Free: Again, for the record, that formula is shown on page 2, the first column, between lines 20 and 27 of the Gessler patent.

Q. Now will you take a sample of each of the inks, that is Lefferts and Stevens and Gessler as you have made them up, and put them on a piece of paper side by side. A. I have marked this pad of paper which I am going to use for demonstration on the left side, "L.S." for Lefferts and Stevens ink.

Mr. Free: I will mark that piece of paper for the time being as Defendant's Exhibit H for identification.

(Marked Defendant's Exhibit H for identification.)

Mr. Free: I will offer it later.

(The witness demonstrates.)

Q. Now describe what you are doing there. A. I have (381) placed a small amount of Lefferts and Stevens ink under the letters "L.S.", and on the same pad to the right, under the name "Gessler" I put an equal portion of the Gessler ink.

Q. Now as it is spread rather thickly on that paper, Defendant's Exhibit H for identification, is it showing any sign of evaporation? A. No. That will not evaporate at room temperatures, as I will show.

I will now take what is commonly known as a pull down knife and make a thin pull-down of these two inks, one against the other (demonstrating).

Q. You have now spread those two inks in a thin film on the exhibit, the paper, Exhibit H for identification, have you not? A. I have.

Q. Side by side? A. Yes. Now, your Honor, you can see they are still wet (handing to Court).

The Court: Both of them?

The Witness: Yes.

Mr. Free: The witness smears the two rows of ink on Exhibit H for identification, to show they are still wet.

The Witness: Now in the heat process to test inks in the laboratory, we simply pass them over this way (illustrating).

Q. I noticed as you passed the paper over the burner (382) smoke or fume seemed to rise. What is that? A. That is the volatile solvent leaving the ink.

Q. Being driven off? A. Being driven off by the heat.

The Court: In one of them, or both?

The Witness: Both of them.

Q. How do you find those inks after you pass them over the heat on Exhibit H for identification? A. Gessler ink is dry; Lefferts and Stevens ink is dry. I test these by running my fingers over the ink (illustrating).

The Court: They are both dry after passing over the heat?

The Witness: Yes. Now this part, the upper portion that I did not pass over the flame, should still show that the inks are not dry, where the ink was not passed over the flame.

Q. And you have demonstrated that by smearing the top ends of the columns on Defendant's Exhibit H for identification? A. That is right.

Mr. Free: I offer in evidence as Defendant's Exhibit H the exhibit sheet just provided by the witness and formerly marked for identification.

(Defendant's Exhibit H for identification received in evidence.)

(383) Q. After that demonstration with Exhibit H, tell me whether or not what you have just demonstrated and shown us conforms to this description in the Lefferts and Stevens patent:

"By means of our improved ink, when used in connection with heat and pressure, as above stated, a hard and permanent impression is produced, and the printed sheets or articles may be piled together immediately after they are taken from the press."

That is in line 109 of the second column of page 2. A. That is exactly what I demonstrated, that after these two inks were passed over the heater the inks were completely dried, and had they been coming from a printing press they could have been piled one on top of the other without offset.

Q. The drying time when the paper was passed over the heat was a matter of a second or two, was it not? A. A matter of a few seconds.

Q. I notice at the top part of the ink on Exhibit H is still moist. That part did not pass over the heat?

The Court: No, I do not think it is moist.

Q. They are both still a little moist? A. Yes, that portion did not pass over the heater.

Q. And is it fair to say that the Lefferts and (384) Stevens ink which is still moist after quite a while is, as stated in line 64, of such slow-drying nature by virtue of which property they will keep the ink in a moist condition for a long time?

Mr. Byerly: I object to that. Whether that is a fair statement I think is for the Court to determine. I think it is for the Court to determine whether it has been a long time or not, and not for this witness.

The Court: He can state if he has tried it what the results of his experiments were.

Mr. Byerly: I think the question was predicated on the experiment here and the state of the exhibit now.

Q. How many times have you tried these Lefferts and Stevens inks? A. Oh, dozens of times.

Q. Did you or not find it to be a fact that they kept moist for a long time even when exposed to air? A. They will keep moist for a period of weeks.

The Court: That sheet, Exhibit H, would be moist for weeks if you had not put it over the flame?

The Witness: Except for what portion might be absorbed by the paper. If that were glass it would remain sticky or tacky for weeks.

Q. How about ink rolls, would it have the same property on ink rolls? A. The same property on ink rolls. It would have a long press life.

(385) Q. Is that due to the low volatility of the solvent or not? A. That is due to the low volatility of the solvent. Of course, it is only common sense if the solvent does not evaporate at room temperature the ink will stay moist.

The Court: What solvent did Stevens use?

The Witness: The solvents then known in 1888, the natural solvents from the plants, such as oil of cloves, oil of cassia, cinnamons.

The Court: Was butyl carbitol known at that time?

The Witness: Not until 1928.

Q. Have you made up any other inks in accordance with Lefferts and Stevens' formulas and printed with them? A. I made up inks of all his formulas in small quantities, and I printed with nitro-benzole primarily, because nitro-benzole is mentioned here. Nitro-benzole is a common industrial chemical that is easy to obtain, and I made prints of that ink against the butyl carbitol, and I have those ink prints with me.

Q. Can you show them to us, please? A. (Producing.)

Mr. Free: The witness shows me a cardboard having on it four samples of printing, and I ask that this cardboard be marked for identification as a whole.

(Marked Defendant's Exhibit I for identification.)

(386) Q. Will you tell us what that Exhibit I for identification shows? A. Exhibit I for identification is a comparative chart of the ink, as taught by Lefferts and Stevens, printed in comparison to the ink as taught by Gessler. The formulas are given for the Lefferts and Stevens formula, as follows: 120 parts of chrome yellow pigment, 50 parts of H rosin, 9 parts of castor oil, 30 parts of nitro-benzole.

Mr. Byerly: Would you ask the witness to read that formula again?

Q. Yes. A. Chrome yellow pigment 120 parts, H rosin 50 parts, castor oil 9 parts, nitro-benzole 30 parts.

Q. You referred to the upper lefthand corner illustration, did you not? A. The formulas for two proof prints on the upper part of the charts are for a Lefferts and Stevens type of ink.

Q. Let us mark the one on the upper righthand corner with the number 1 and the one on the upper lefthand corner with the number 2. Now, will you tell us the difference between those two? A. The inks are exactly the same. No. 1 is printed on paper. No. 2 is printed on cellophane, moisture-proof cellophane. This yellow color that I just pulled down here shows that they were heat-dried. For a test I put this ink on a small printing (387) press and printed these samples.

The Court: Which ink?

The Witness: I used the Lefferts and Stevens ink. One is on paper and one is on moisture-proof cellophane. I then passed them through an oven and dried the ink. I left them in the oven about ten seconds at 150 Degrees Centigrade.

Q. When they came out how dry were they? A. Completely dry.

Q. From your experience with these inks would you indicate what degree of quality they exhibit?

Mr. Byerly: I do not quite understand it. You mean what quality of printing you have here?

Mr. Free: That is right.

Mr. Byerly: I do not think this witness has been qualified as an expert printer.

The Court: The objection is sustained.

Q. In your experience with testing inks in this fashion, what can you say about the quality of the print?

Mr. Byerly: That is the same question.

The Court: The same question.

Q. How many times have you done printing with inks of all kinds in this fashion? A. Since 1926 that has been one of the major parts of my work.

Q. Tell us how you go about it? A. We have what is (388) known as a small proof press and the ink is spread out on a plate with a roller. Then the type on the proof press is inked and a proof pulled. The proof was dried, as I mentioned, in an oven, and the same test was made with the Gessler type ink.

Mr. Free: I think he is qualified to answer that question now, your Honor. He has done that so many times, and now I would like to ask him.

Q. From those tests over the period of 16 years, I believe you said, what can you say as to the quality of the printing compared with other similar printing tests that you have made?

The Court: I do not see any printing on here.

Mr. Byerly: If there is going to be some information given as to quality, as to whether you can use it in a magazine, or whatnot, that would require a printer and not just a chemist who makes up proofs.

The Court: What is the question?

Clinton Taylor, for Defendant—Direct.

Mr. Free: I am asking him what the quality of those prints are, whether good printing or not, based on his experience with similar testing work done over many years.

The Court: I do not think he is qualified to say that.

Q. Now, will you discuss the two lower sheets on this (389) card, which I mark 3 and 4, Exhibit I for identification, and tell us what they are. A. In order to make a comparison between the Lefferts and Stevens ink I had to make up an ink as taught by Gessler, and these two lower prints are prints of such an ink as the one taught by Gessler.

Q. What are the formulas? A. The formula is: Chrome yellow pigment 120 parts, H rosin 50 parts, castor oil 9 parts, butyl carbitol 30 parts.

Q. No. 3 is printed on paper as is No. 1, and No. 4 is printed on cellophane as is No. 2, is that right? A. That is correct.

Mr. Free: I offer in evidence as Defendant's Exhibit I the card identified by the witness.

Mr. Byerly: I object to that as not proving anything, because in the first place the formula given for the ink at the top is not a formula found in the Lefferts patent, and, in the second place, these are mere samples of test printing, and give no perception of how the inks would work in an actual printing press.

Mr. Free: As to the first objection, nitro-benzole is listed in line 35 as one of the solvents in Lefferts and Stevens.

The Court: I think the first objection should be overruled. I think the second one is good. That is not (390) a real commercial printing job.

Mr. Free: This is merely to show that Lefferts and Stevens' inks make prints when put on paper

and cellophane, and thereafter if heated the volatile solvent dries off.

The Court: We have already had that drying off.

Q. Now, I would like to ask you what you know about vapor pressures of some of the solvents shown and described in the Lefferts and Stevens patent. A. One of the first things that I did in comparing these solvents mentioned in the Lefferts and Stevens patent was to take their vapor pressures in accordance with the Gessler patent, using the Brewer and Gardner method.

Mr. Free: That is referred to in line 64 of page 2, column 1 of the patent, and I offer in evidence a photostatic copy of the Brewer and Gardner article referred to in the patent in suit, as Defendant's Exhibit J.

(Marked Defendant's Exhibit J.)

Q. The Brewer and Gardner article referred to in the patent here in suit states, on the first page, second column:

"The procedure followed in determination of (391) the vapor pressure was that originally described by Ramsay and Young."

Tell me whether or not you used as Brewer and Gardner did the Ramsay and Young method, and how you went about doing so? A. After reading this article, of course, I got out the Ramsay and Young method of taking vapor pressure, and set this equipment up in the laboratory as described by Ramsay and Young, with one exception, that Brewer and Gardner had added a large flask to their equipment.

Mr. Free: The authority for doing so is found in Brewer and Gardner, in the second column. It says:

"It is particularly important that a large, insulated bottle be inserted in the system in order

to obtain more constant pressure readings." Otherwise the apparatus is precisely as described in the Ramsay and Young article, and to illustrate what Ramsay and Young's method is I offer in evidence photostatic copy of the original of Journal of the Chemical Society, for 1888, pages 42, 43, 44 and 45, which is referred to in the footnote 6 of the Brewer and Gardner article.

(Marked Defendant's Exhibit K.)

Q. You erected apparatus in accordance with Ramsay and Young and Brewer and Gardner? A. I did.

(392) The Court: This article was printed after this patent was applied for?

Mr. Free: Yes, it is referred to in the patent in suit.

The Court: What is the probative value of it?

Mr. Free: Merely to show that we are using the same method that the patentee used to determine the vapor pressure, as used in the Lefferts and Stevens patent.

Q. I hand you three photographs of apparatus and ask you whether that represents what you used to determine vapor pressures of certain solvents? A. These are photographs of the equipment that I set up in the Hilton Davis laboratory to determine the vapor pressures of all the solvents in the prior art, and, second, of the solvent butyl carbitol specified by the Gessler patent.

The Court: When did you make these experiments?

The Witness: These experiments started in September 1941.

The Court: After this suit started?

The Witness: Yes.

Q. And some of those vapor pressure tests with that apparatus shown in the photographs were conducted in the presence of plaintiff's counsel, Messrs. Byerly and Watson? A. Yes.

(393) Mr. Byerly: That was only for a small part of the tests. They showed us the apparatus, your Honor, I will be glad to admit that.

Mr. Free: I offer in evidence the photographs of the apparatus used by the witness to determine the vapor pressure characteristics of certain solvents, as a group, as Defendant's Exhibits L-1, L-2 and L-3.

(Marked Defendant's Exhibits L-1, L-2 and L-3.)

Q. With this apparatus shown in these photographs, L-1, L-2 and L-3, according to the Brewer and Gardner method mentioned in the patent in suit, you measured the vapor pressure of certain solvents of Lefferts and Stevens, did you not? A. I did.

Q. Which ones? A. I measured the vapor pressure of all the solvents of Lefferts and Stevens, except the oil of hyssop, which I could not obtain. It was necessary to do this, inasmuch as Gessler has specified a certain vapor pressure, and I did use the method that Gessler has so carefully written out here, the Brewer and Gardner method.

Mr. Byerly: I object to the qualification the way things are written out. The patent mentions that they may be measured by this method, and I think the witness's answer should go out as argumentative.

The Court: Strike it out, that last part of it.

(394) Q. You did use the Brewer and Gardner method described in the patent in suit? A. Exactly.

Q. Let us take up first the solvent whose vapor pressure you measured with this apparatus, L-1, L-2 and L-3, in the presence of Mr. Byerly and Mr. Watson, what was that? A. That was oil of clove.

The Court: Oil of clove is used as a solvent, is it?
The Witness: Yes.

Q. With the apparatus you tested oil of clove and noted down the vapor pressure readings? A. I did.

Q. Do you recall that those readings were checked by one of plaintiff's representatives? A. They were.

Q. Do you have the reading sheet that you noted the data on during those tests in the presence of plaintiff's counsel? A. This is the sheet that I put my readings down on as I took them before the plaintiff's counsel.

Mr. Free: I offer in evidence as Defendant's Exhibit M the data sheet provided by the witness, showing the vapor pressure, the millimeters of mercury at certain temperatures Centigrade, of oil of cloves mentioned in the Lefferts and Stevens patent.

Mr. Byerly: I object to the exhibit on the ground that there is no proof as to the fact that this (395) was oil of cloves of the type of oil of cloves that was current in 1888.

Q. Where did you get the oil of cloves? A. From Fritchie Bros.

By the Court:

Q. Has there been any improvement in oil of cloves since 1888? A. No improvement. It was U.S.P. oil of cloves, commonly sold in drugstores.

Q. Do you know whether it was the same in 1888? A. It comes from the clove plant.

Q. You do not answer the question. Do you know whether oil of cloves in 1888 was the same as this that you used? A. Well, I would say it is.

Q. How do you know it is? A. The plant certainly has not changed any.

Q. It is an extract made by a process? A. An extract of oil from the plant.

The Court: The objection is sustained. The witness cannot identify it as the same oil of cloves.

By Mr. Free:

Q. These tests were made from an oil of cloves made recently by you? A. They were.

Q. How is oil of cloves made, do you know? A. It is made by extracting the small clove seeds and also it is taken from the blossom of the clove plant.

Q. How is the oil of cloves furnished to the trade, (396) how do you buy it? A. I bought it in a one-pound bottle.

Q. The same as you buy any other oil or solvent? A. Exactly.

Q. You go to the manufacturer and buy it? A. That is right.

Q. The same as you buy butyl carbitol? A. Certainly.

Q. Or ethyl alcohol? A. Yes.

Mr. Free: I offer now this report of Mr. Taylor's on the vapor pressure of oil of cloves as oil of cloves is now available, as indicating the vapor pressure of it, subject to the right to prove a U. S. Pharmacopoeia of an earlier date giving the method of extracting the oil of cloves.

Mr. Byerly: I object to that until he has proved it. I have no objection to his marking it for identification for the moment. It seems to me he has not proved that is what the patent refers to.

Mr. Free: These patents published in the Patent Office, often as far back as a hundred years ago, are still available for publication and reference for what they show as to the art, now and from now on.

The Court: Testing out or making chemical tests with a substance that existed in 1888 and comparing it with the substance of the same name of today, does not do any good unless you know you have the substance (397) as it existed in 1888, and there is no proof of that here.

Mr. Free: I think it might be impossible to prove it.

The Court: That may be. It is a problem I do not have to meet.

Mr. Free: The difficulty is with all these things that as time goes on it may be utterly impossible to obtain and produce it here in court.

The Court: That does not do away with the rules of evidence.

Mr. Free: It may be utterly impossible to obtain, 30 years later, oil of cloves which was produced in 1888.

The Court: It can go in as an experiment with oil of cloves as bought on the market today.

Mr. Free: That is all I ask at this time.

The Court: It will be admitted with that limitation.

Mr. Free: And I would like to be free to prove oil of cloves as it existed in 1888, if that is possible.

(Marked Defendant's Exhibit M.)

The Court: In the art of chemistry isn't there some way of tracing these things back and showing what was in them?

The Witness: I think there would be changes in some commercial products, but oil of cloves, oil of cinnamon, are (398) extracted from natural plants, as are oil of wintergreen or peppermint.

The Court: There is no art that has developed like the art of chemistry in the last several years, and we ought to be careful about this.

Mr. Free: I think the burden is really on the plaintiff to show that this oil of cloves is different than it was in 1888.

The Court: You are offering something as it was in 1888, and so it is up to you to prove it.

Mr. Free: I offered the patent, which happens to be published in 1888, to instruct the art from now on and in the future in the making of inks as described in that patent. Now, when he is compounding an ink in accordance with Lefferts and Stevens' patent he would go out and obtain from the source where it was available such solvents as he could, just like one operating under the patent in suit would go out and obtain butyl carbitol at the present time. He would not be asked to go back to 1932 and buy butyl carbitol as it was then, because it would be impossible. And so the same burden attaches to the plaintiff as attaches to us, he had to show the same thing.

The Court: He did not make the objection at the proper time.

(399) Mr. Free: I think the objection is a very poor one, if I may say so, because we are dealing now with a publication which we have before us, and which teaches us what we want to know at the present time.

Q. You have drawn some curves of butyl carbitol and oil of cloves on some cross-section paper, indicating the vapor pressure of the substance as shown on Exhibit M, have you not? A. I have.

Q. Will you tell us how you went about making that curve? A. The points determined on this chart marked "Vapor Pressure Chart" were determined in the equipment as just described, the Ramsay and Young type of vapor pressure equipment, and the determinations were made in the presence of counsel for the plaintiff, simply to show, you might say, that our equipment checks with the Brewer and Gardner equipment.

Q. You plotted those points obtained on Exhibit M on that cross-section paper showing the vapor pressure in millimeters of mercury with increase in temperature, did you not? A. I did.

Q. Referring to that curve for oil of cloves, will you indicate what the vapor pressure is at 20 degrees Centigrade?

Mr. Byerly: I object to this on the same ground, that it is not the oil of cloves of 1888. I think (400) if it is admitted at all it should be subject to the same exception that your Honor made before.

The Court: The record shows all that, so go ahead.

Q. (Read.) A. That chart does not have 20 degrees Centigrade on it. This chart was merely made to check the points determined while the plaintiff's counsel was present.

Q. State whether or not the vapor pressure of oil of cloves as shown on this chart is less than .1 millimeters, the lowest point on this curve? A. It is less than .1 millimeters.

Q. Still referring to the vapor pressure curve on this chart, will you indicate what it is at a hundred degrees Centigrade for oil of cloves? A. At 100 degrees it would be 33 millimeters.

(401) Q. And what is butyl carbitol as shown on that curve at 100 degrees Centigrade? A. 60 millimeters.

Q. At 100? A. I did not read that correctly. At 100 degrees butyl carbitol is 6; at 100 degrees oil of cloves is 3.3.

Q. That is in centimeters or millimeters? A. That is in millimeters.

Q. Now will you give the reading for oil of cloves and butyl carbitol at 150 degrees Centigrade, as shown on this chart. A. Oil of cloves at 150 degrees is 32 millimeters; butyl carbitol 68 millimeters.

The Court: Almost on the 70 line, isn't it?

The Witness: Almost on the 70 line it runs.

Q. The data shown on that sheet for butyl carbitol was obtained where? A. On this butyl carbitol there are two

types of data, that taken from Brewer and Gardner, which is a circle, and the points marked with asterisks were determined by me in front of the—with the plaintiff's counsel witnessing the determinations.

Q. Now I show you a set of columns which are marked "Temperatures in degrees Centigrade", and "Vapor Pressure in Millimeters of mercury for butyl carbitol" and ask you whether that represents the data taken in the presence of plaintiff's counsel? A. This is the data taken in the presence of plaintiff's counsel.

(402) Q. For butyl carbitol? A. For butyl carbitol.

Q. Where did you obtain the butyl carbitol? A. From the Carbide & Carbon Chemicals Corporation.

Q. That was obtained in the presence of plaintiff's counsel? A. We opened a sealed drum in the presence of plaintiff's counsel.

Mr. Free: I offer in evidence as Defendant's Exhibit N the data sheet made by the witness in determining the vapor pressure for butyl carbitol.

(Marked Defendant's Exhibit N.)

Q. Incidentally the butyl carbitol that you tested with Exhibit N was obtained from the same source that Brewer and Gardner state they obtained theirs; is that right? A. That is correct.

Q. That is the Carbide & Carbon Chemicals Corporation? A. Yes, sir.

Q. Now will you check the curve you have just referred to with the butyl carbitol readings given in the patent in suit at the bottom of the first column of page 2. A. I have checked these readings at 100 degrees Centigrade and 150 degrees Centigrade. The Gessler patent gives butyl carbitol at 100 degrees Centigrade 6.4 millimeters, and my reading at 100 degrees Centigrade is 6 and a fraction.

At 150 degrees Brewer and Gardner, or the (403) Gessler patent states the vapor pressure of butyl carbitol is about 60 millimeters. I have at 150 about 69 millimeters.

Q. Refer to the Brewer and Gardner article, and tell me what they give as the vapor pressure for butyl carbitol at 150? A. In the Brewer and Gardner article, page 181, they give their readings from which they constructed their chart, and the last reading they took for butyl carbitol— (examining).

The Court: We will take a 10 minute recess in the meantime.

(Short recess.)

Mr. Free: What was the last question?

(Last question read.)

Q. Did you find the reading given by Brewer and Gardner for butyl carbitol at 150 degrees Centigrade? A. The last reading, the closest reading to 150 degrees Centigrade is 152.9, and the reading is 69.3 millimeters vapor pressure.

Q. And you found all the way along in your tests with butyl carbitol that they conform substantially with Brewer and Gardner's reading, did you not? A. I did.

Mr. Free: I mark for identification the chart referred to by the witness, as Defendant's Exhibit O.

(Marked Defendant's Exhibit O for identification.)

(404) Q. Now, Mr. Taylor, I want to ask you whether you made vapor pressure tests with this same Brewer and Gardner apparatus of other solvents named by Lefferts and Stevens? A. I did.

Q. I show you a set of curves which I marked for identification as Defendant's Exhibit O, and ask you whether or not these curves indicate the vapor pressures of the solvents that you have mentioned, that of Lefferts and Stevens (handing to witness)? A. These are curves I made for determining the vapor pressure of the solvents mentioned in Lefferts and Stevens.

Q. These vapor pressures were taken in the same way and with the same apparatus shown in Defendant's Exhibits L-1, 2 and 3, were they? A. They were.

Q. I notice on that set of curves there is butyl carbitol marked heavily. Is that curve based upon some readings you referred to a while ago? A. That is based on the Brewer and Gardner, and upon my readings, that I checked against the Brewer and Gardner readings.

Q. On that same set of curves I notice one marked "S and C 502-C oil" down near the bottom. Tell me whether or not that was measured with the same apparatus shown on Defendant's Exhibits L-1, 2 and 3? A. That was measured with the same vapor pressure equipment.

The Court: What is the "S and C 502"?

(405) Mr. Free: That is the solvent in the ink which is charged to infringe here. That is the defendant's oil.

The Court: What does the "C" stand for, butyl carbitol?

Mr. Free: No, we do not have butyl carbitol or butyl carbitol acetate at all. That is the high boiling petroleum fraction that we have been talking about, made from petroleum.

Q. These oils, including nitro-benzole, oil of pennyroyal, oil of fennelseed, oil of sassafras, shown to the left of the butyl carbitol curve, and oil of cinnamon and oil of cassia and oil of clove shown between the butyl carbitol curve and defendant's 502-C oil were obtained by you in the open market? A. That is correct.

Q. And tested by you to obtain the vapor pressure data shown on this sheet? A. Yes.

Q. And you have plotted it on this sheet? A. I did.

Mr. Free: I offer in evidence the set of curves just identified, as Defendant's Exhibit P.

Mr. Byerly: Your Honor, I object to the exhibit on the ground that the exhibit states it refers to oil

specified in the Lefferts patent, whereas the witness has stated that these measurements were made on the oils of today, not as of 1888.

The Court: We will take them as of today. He (406) said he purchased them in the open market, anyway.

Mr. Byerly: Yes.

By the Court:

Q. May I ask you, are all these ingredients that you tested here used as solvents? A. They are all solvents; yes sir.

Q. Commercially used in the trade of chemistry? A. Oil of cloves is used.

Q. And all of them used for making ink? A. Nitrobenzole and oil of cloves have the properties of the Gessler patent.

Q. How about the cinnamon? A. No.

Q. How about the pennyroyal? A. Cinnamon and pennyroyal and fennelseed, and oil of sassafras possibly; oil of cloves is most common.

By Mr. Free:

Q. That is, oil of cloves today is still being used in ink? A. Oil of cloves today is still being used in ink.

The Court: It will be received.

(Marked Defendant's Exhibit P.)

Q. Still referring to Defendant's Exhibit P, will you indicate from that curve for oil of cloves what its vapor pressure is at 150 degrees? A. The vapor pressure is 33 millimeters at 150 degrees Centigrade.

(407) Q. And what is the vapor pressure of the defendant's oil at 150 degrees Centigrade, as shown on that curve, Defendant's Exhibit P? A. 20 millimeters at 150 degrees Centigrade.

Q. And, again, what is the vapor pressure of butyl carbitol as shown on that curve, Defendant's Exhibit P, at 150 degrees? A. 60 millimeters.

Q. Now oil of cinnamon and oil of cassia also lie between the defendant's 502-C oil and butyl carbitol. Will you tell us what the vapor pressure of those two substances on Defendant's Exhibit P is? A. Oil of cassia at 150 degrees Centigrade is 40 millimeters vapor pressure; oil of cinnamon at 150 degrees Centigrade is 43 millimeters of vapor pressure.

Q. Now I show you a similar set of curves, but straight lines, and ask you what you know about that? How did you go about making that set of curves (handing to witness)? A. This second chart is made on what is known as log paper, and is used to extend the curves shown on chart, Exhibit P, so that we may determine the vapor pressure of the solvents at room temperature.

Q. That is to say, the curves on the sheets you are now referring to are the same as the curves on sheet marked Defendant's Exhibit P, except made in a straight line; is that right? A. That is correct.

(408) Mr. Free: I offer in evidence as Defendant's Exhibit Q the second set of curves, showing solvents obtained from Lefferts and Stevens patent, including butyl carbitol and defendant's 502-C oil.

(Marked Defendant's Exhibit Q.)

Q. In making the test of vapor pressures with the apparatus shown in Exhibits L-1, 2 and 3 with 502-C oil, where did you get that oil? A. From the Sinclair-Carroll Company.

Q. Do you have a sample of it? A. I do (producing).

Q. This sample which you handed me is the same sample from which you took the vapor pressure test in the presence of plaintiff's counsel; is that correct? A. That is correct.

Mr. Free: I offer in evidence as Defendant's Exhibit R the sample container of defendant's solvent in the ink here accused to infringe.

(Marked Defendant's Exhibit R.)

Q. Now, Mr. Taylor, will you refer to the Doughty patent, next in order of chronological sequence, No. 1,439,696. Refer to line 38 of page 1, the first column. I will read:

"A difficulty which has prevented the use of metallic pigment inks is due to vehicles which dry too rapidly on the inking rolls, covering them (409) generally with a gummy coating which prevents transfer of the ink to the type or die."

I want to ask you whether that describes the condition we have been talking about, of inks containing solvents that are too volatile? A. That is exactly what he means.

Q. Then in line 46 he says:

"It is the object of the invention, therefore, to provide an ink and an ink vehicle having the necessary properties, among others comparative slowness in drying without a tendency to become gummy, a consistency permitting transference of the ink through inking rolls to the type or die, rapid drying when applied to the work, and ability to protect the pigment from oxidation and consequent discoloration."

I will ask you whether that describes a property similar to the one you displayed with the heat test of Lefferts and Stevens ink?

Mr. Byerly: I object to that, your Honor. The passage speaks for itself, and the question is incompetent.

The Court: Yes. All that is necessary is to call the Court's attention to that. Objection sustained. It is too obvious to require any explanation.

Q. Then in the second column of the first page, line 1, (410) he states:

> "I have discovered that these desirable properties may be imparted to the ink by the use of a suitable medium in the vehicle for the pigment and that such a medium will, moreover, permit rapid drying of the ink by the application of heat to the type or die."

Now in such an ink as he has described, what results when you apply heat to the type or die printing with the ink?

Mr. Byerly: If your Honor please, the patent states what is the result, and I think that, too, is an incompetent question.

The Court: I think that is correct—unless you want to dispute that statement.

Mr. Free: No. I asked him to characterize it, that is all.

Q. In the next line, 62:

> "The medium"—that is the solvent—"should be volatile, i.e., capable of being vaporized without carbonization, but its boiling point should be relatively high to reduce vaporization at atmospheric temperatures, and consequently to prevent rapid drying on the inking rolls."

Now from your experience with the inks such as he describes, how high should the boiling point be?

(411) Mr. Byerly: I object to that. The witness is not shown to have had any experience with the inks described in this patent, and the patent states what the boiling point is that the inventor had in mind.

The Court: Sustained. These are all questions for argument, I think.

Q. I call your attention to the sentence beginning in line 79 of the second column of page 1:

> "A suitable medium may be found in the derivatives of the terpene series of hydrocarbon compounds, the alcohols, of which terpineol is an example, being admirably adapted for the purpose."

Then down further he mentions benzyl alcohol and terpinyl acetate, benzyl acetate and ethyl benzoate.

I would like to ask you whether you tried out any of the solvents in inks that he mentions there? A. I did. I made up a sample of terpineol ink and tested it for its printing qualities and drying qualities when heated.

> The Court: You mean tried it as a solvent?
>
> The Witness: Tried it as a solvent, and I tried it as a medium in an ink.

Q. Tell us what you discovered when you made those tests with an ink containing terpineol? A. The ink made with terpineol does not dry at atmospheric temperature, (412) but on the application of heat it dries in a matter of seconds.

Q. Can you demonstrate here an ink made up of any of the solvents there described? A. I have such an ink made up with terpineol.

Q. Will you please demonstrate it, as you did before with the Lefferts and Stevens ink. A. I will.

> Mr. Byerly: Your Honor, I wonder if we could ask the witness to state the formula of the ink he is trying.
>
> Mr. Free: Yes.
>
> (At this point the heater was set up.)

Q. You have here a sample of the ink which you made up according to the Doughty patent, have you? A. I have; and I will read the formula:

Chrome yellow pigment, 23 parts; Cumar resin—I would like to put before that that I make a varnish of Cumar resin, 40 parts; terpineol, 50 parts. Of that resin I use 10 parts, making an ink.

Mr. Byerly: Of the varnish you mean you use 10 parts.

The Witness: Of the varnish, Cumar resin and terpineol, I use 10 parts. Now then——

The Court: What did you call that test—what kind of test?

(413) Mr. Free: Vapor test of the ink described in the Doughty patent.

The Court: What exhibit number is that?

Mr. Free: I will mark that for identification as Defendant's Exhibit S.

(Marked Defendant's Exhibit S for identification.)

Mr. Byerly: Did you offer that in evidence?

Mr. Free: No.

Mr. Byerly: Your Honor, I wish to object to this test, on the ground that the formula just stated by the witness widely differs from that given in the patent. If you will look on page 2 of the patent, beginning in the first column, line 38, he states the formula for this stamping ink embodying this invention, in which he speaks of the four parts of terpineol to one part of ordinary resin. You will notice that in the example given a different kind of binder has been used, and the proportions are widely different.

Mr. Free: If your Honor will refer to page 2, line 45, you will see that it states:

"The proportions of resin and solvent may be varied within the limits necessary to produce a vehicle of the proper viscosity."

So you can use any amount of proportions you want to get the thickness.

(414) The Court: Where is that set forth in the patent?

Mr. Free: Terpineol is mentioned.

The Court: How much of it?

Mr. Free: Four parts is mentioned in line 39 of page 2—4 parts of terpineol or benzyl alcohol, if you like.

The Court: He has there one part of ordinary resin.

Mr. Free: Yes, and then the resin specifications differ. You can use any resins you like, such as synthetic resins, which are mentioned on page 1, lines 95 to 102. He says:

"In carrying out the invention the solvent is combined with a thickening agent forming the body of the vehicle. Preferably a resinous material such as colophony (ordinary rosin), dammar, copal, Bergundy pitch or Canada balsam, or a synthetic resin, i.e., a phenol condensation product, is dissolved in the solvent to produce a vehicle of the desired consistency."

The Court: Objection overruled.

Q. Now, Mr. Taylor, will you take a sample of the Doughty ink that you have produced——

Mr. Free: And which I mark in evidence as (415) Defendant's Exhibit T.

(Marked Defendant's Exhibit T.)

Q. —and a sample from the same Gessler ink that you mentioned before——

Mr. Free: And which I offer in evidence as Defendant's Exhibit U.

(Marked Defendant's Exhibit U.)

Q. Place both on a piece of paper side by side. A. I am now making a smear of the Doughty ink on the lefthand side of the pull-down pad, and a similar smear of the Gessler ink on the righthand side of the pull-down (demonstrating).

Q. You are now spreading the ink out thin in two parallel columns? A. Comparable to the thickness that would be applied to a piece of paper when printed. (Witness illustrates.)

Q. You are now smearing the ink to show that it is moist? A. Yes, sir; quite moist.

Q. And you are now passing it over the heater, and what is the smoke that seems to be coming off? A. The solvent is being volatilized by the heater.

The Court: How hot does it get?

Q. They are both dry now, are they? A. They are both dry.

Q. You have passed it over the heater? A. That is (416) correct.

Q. Do you notice any difference in the drying between the two samples? A. I do not.

Mr. Free: I offer in evidence as Defendant's Exhibit T the sample formerly marked for identification, of the ink which was made according to the comparative tests of Doughty and the Gessler inks.

Mr. Byerly: I would like to note an objection to that, because this patent states—the beginning of the patent was not read to your Honor, but you will find in the beginning of the specification, line 12 on page 1:

"This invention relates to inks and vehicles therefor, and particularly to metallic pigment inks suitable for use in stamping titles and decorative designs on book-bindings and for other purposes to which the ink may be adapted."

The patent further specifies a metallic ink. The only examples they specify are an artificial gold or heavy metallic pigment in ink. Now such an ink has not been produced here, and I think there is no objection if your Honor thinks it is of any probative value to show an ink made up of terpineol. I am not objecting to that, but that ink is so far from the patent that I would like to object to it on that basis.

Mr. Free: I will answer that, your Honor, by (417) reading line 67 of page 2 of the Doughty patent, where it is stated:

"The color will depend upon the particular pigment employed which may be other than metallic in character."

The patent is not limited, therefore, to metallic inks, but extends to any other inks, depending upon the color you want.

The Court: "Various changes may be made in the details of the invention without departing there from or sacrificing any of the advantages thereof."

Mr. Byerly: Such statements usually attach, your Honor, but if this is illustrating what the patent describes I think it should follow the teachings of the patent and make the kind of ink we are talking about.

Mr. Free: Oh, it is indeed. In speaking about the color he states the color will depend on the particular pigment employed. This is yellow pigment. The patent is not limited to gold, or anything else, so we have selected yellow because that is the color described by Gessler, and we want to show the comparison all the way through.

The Court: Well it will be accepted with the limitations pointed out by counsel. Objection overruled.

(Defendant's Exhibit T for identification (418) received in evidence.)

The Court: Would you describe this ink as a metallic ink?

The Witness: The one I made, your Honor?

The Court: Yes.

The Witness: No, that is not a metallic ink.

The Court: Where did you get a description of it in the patent then?

The Witness: I used the yellow pigment all the way through. You will notice that, because the Gessler patent describes yellow, and rather than have any question as to why there is a difference here I took a chrome yellow through all my experiments. I have, however, ink made with aluminum.

The Court: Do you have that here?

The Witness: Prints of that ink, yes.

The Court: You could not make those experiments with it?

The Witness: No, sir.

Q. You do not have any made up? A. I do not have any made up.

The Court: How would it act if you did have it?

The Witness: It would be just the same; about the only question here is whether or not the solvent will evaporate with heat, and terpineol evaporates with heat.

(419) The Court: What is this, with terpineol?

The Witness: On one side with terpineol, and on the other side with butyl carbitol. On one side you will have metallic pigment or chrome yellow or black or red.

The Court: Whether it is a metallic pigment or not would not make any difference?

The Witness: Not a bit of difference, not a particle of difference, because that stays in the binder.

Q. You were asked about metallic pigments, and you stated that you tried out some. I show you a card——

Mr. Free: Which I mark for identification as Defendant's Exhibit V.

(Marked Defendant's Exhibit V for Identification.)

Q. —and I ask you, Mr. Taylor, to describe what is on that sheet, with particular reference to the silver-looking samples there. Tell me what they are made of (handing to witness). A. You mean the silver inks or all the inks?

Q. Begin with the silver inks. A. The silver inks are made in accordance with the Doughty patent. I used 40 parts of terpineol, 10 parts of rosin and 100 parts of aluminum pigment.

Q. That is a common metallic pigment, isn't it? A. That is a common aluminum metallic pigment.

(420) Q. Having made up those inks in accordance with the Doughty patent, as you described, what did you do with them on this sheet? A. I mixed the inks, ground them, and printed these proofs, and dried them myself.

Q. Describe how you did it, and what happened, particularly the drying of it. A. Well, after printing these on a small proof press I placed the samples in an oven and dried them in a matter of a few seconds at 150 degrees Centigrade, and then, as we determined in the court, by rubbing my finger over the print they were all dry, showing that the terpineol had been evaporated completely, leaving the binder and pigment on the paper.

Q. In doing so did you notice a smokelike vapor coming off the paper, like we had here? A. In all cases you got a smokelike vapor.

Q. What is that? A. That is solvent, leaving the pigment and binder.

Q. On the paper? A. On the paper.

Q. I notice on this sheet also, over in the righthand corner two ink formulas, Nos. 71 and 73, and I ask you what they are (handing)? A. No. 71 ink formerly was

made with—the solvent is butyl carbitol, and No. 73 ink, the solvent is terpineol.

The Court: Do you know the difference between them?

The Witness: The proportions are the same.

(421) Q. Those also were made as you described, and the heat drove off the solvent in that way? A. Yes.

Q. They were dry after that? A. They were both dry.

Q. I refer you to the Doughty patent again, line 16 of the first column of page 2, which reads:

> "I have also discovered that certain higher boiling liquid saturated paraffin hydrocarbons, e.g., those present in fractions of kerosene boiling above 250° C. at normal pressure may be employed instead of terpineol."

I would like to ask you whether you have tried out an ink made up of a solvent made from kerosene as described and how it worked? A. I made an ink as described, and as far as the working qualities of the ink, the body and the printing qualities and the drying, it was comparable to terpineol or butyl carbitol.

Q. Tell us how you made up that sample of ink from this kerosene fraction? First tell us how you obtained the kerosene fraction. A. Taking a sample of ordinary kerosene, about a quart of kerosene, I distilled in a simple laboratory still that portion of the kerosene which boils below 250 degrees Centigrade. The fraction remaining in the still which boils over 250 degrees Centigrade, I used as my solvent for ink tests, in (422) accordance with the Doughty patent.

Q. Then with that fraction that you took you made up an ink? A. I did.

Q. According to the description in the Doughty patent? A. I did.

Q. Can you show us samples of the results of such ink, referring particularly to Defendant's Exhibit B for identification? A. Ink formula 75 was made with the solvent kerosene fraction, boiling 250 degrees Centigrade and over, 50 parts, and H resin 40 parts. This made the varnish. Using 10 parts of this varnish I ground into this 23 parts of chrome yellow pigment. I printed proofs with this ink and dried them by the same method that I used with the terpineol inks and butyl carbitol inks, and found that they dried in the same length of time and gave a very good ink which does not rub.

Q. Those samples are shown as you identified them on this card, Defendant's Exhibit V for identification, which you just referred to? A. They are.

Q. Included in that is a metallic pigment ink marked 75-D? A. Yes, there is a metallic pigment made with aluminum pigment. The formula I believe is exactly like that written in the Doughty patent—40 parts of kerosene solvent, 10 parts of H resin, 100 parts of (423) aluminum pigment.

Q. That is the example given in lines 38 to 42 of page 2 of the patent, is it not? A. That is right.

Mr. Free: I offer in evidence as Defendant's Exhibit V the sheet identified and described by the witness.

Mr. Byerly: I object to the exhibit as being merely prints made in some kind of a proofing press and being made ex parte. I think it has no probative value. The witness's testimony of what he did is already in.

The Court: I think it illustrates his work.

(Defendant's Exhibit V for identification received in evidence.)

Q. Now, Mr. Taylor, in obtaining this petroleum solvent mentioned in the Doughty patent which you have just de-

scribed, how did you go about it, can you show us a picture of the apparatus that you used? A. I have a picture of such apparatus.

Q. These photographs which you have shown me are an ordinary laboratory still? A. This is a simple laboratory still.

Q. And the apparatus there shown was used to distill the ordinary kerosene to get petroleum solvents, as you just said? A. It was.

(424) Q. Do you remember in doing so the plaintiff's attorneys, Messrs. Byerly and Watson were present? A. Plaintiff's attorney Mr. Watson was there.

Q. Mr. Byerly had gone home, I take it? A. Mr. Byerly had gone to New York.

Mr. Free: I offer the photographs merely to illustrate the still used by the witness to obtain the petroleum fraction mentioned in the Doughty patent.

(Marked Defendant's Exhibit W.)

Q. With that petroleum fraction which you obtained as described in accordance with the requirements of the Doughty patent, you ran some vapor pressure tests of it on the apparatus shown in Exhibits L-1, L-2 and L-3, did you not? A. I did.

Q. Do you have the results of the vapor pressure tests which you obtained at that time? A. I do. I have them before me, and they are marked Exhibit A-A.

Mr. Free: That Exhibit A-A is the exhibit that was used at the deposition and we will change that to Exhibit X.

(Marked Defendant's Exhibit X.)

Q. These figures were noted down by you when you ran the apparatus in the presence of plaintiff's counsel, were they not? A. They were.

Q. I now show you Defendant's Exhibit O for (425) identification, and ask you whether you plotted on that curve the vapor pressure data obtained and shown on Defendant's Exhibit X? A. I plotted this curve of the data obtained on Defendant's Exhibit X to show, primarily, how close the tests made before the plaintiff's counsel checked with tests that I had made previously to their arrival in our laboratory.

Mr. Free: I offer in evidence Defendant's Exhibit O for identification.

(Defendant's Exhibit O for identification received in evidence.)

Q. That chart shows the curves for the kerosene or petroleum fraction you have just described, and the oil of cloves lying between butyl carbitol and defendant's 502-C, does it not? A. It does.

Q. Will you read the vapor pressure from that curve at 100 degrees Centigrade for all four of those curves? A. The butyl carbitol at 100 degrees is 6 millimeters. The kerosene fraction distilled at 250 degrees Centigrade, at 100 degrees Centigrade is 4½ millimeters. The oil of cloves at 100 degrees Centigrade is 3.3 millimeters. The 502-C oil of Sinclair-Carroll at 100 degrees is 2 millimeters.

Q. Will you do the same for all four curves at 150 degrees Centigrade? A. At 150 degrees Centigrade butyl (425a) carbitol is 69 millimeters; the kerosene fraction distilling above 250 degrees Centigrade is 48 millimeters; the oil of cloves is 33 millimeters, and the 502-C oil is 20 millimeters.

Q. Now, do you have a sample of the petroleum fraction which you distilled in the presence of the plaintiff's counsel, as described in the Doughty patent? A. I do.

(Adjourned to January 21, 1943, 10:30 a. m.)

(426) New York, January 21, 1943;
10:30 o'clock a. m.

TRIAL RESUMED.

CLINTON TAYLOR, resumed the stand.

Direct examination (continued) by Mr. Free:

Mr. Free: If your Honor please, I find I neglected to offer this little tin of Lefferts and Stevens ink yesterday, which was tendered by the witness, and I woul like to offer it in evidence now as Defendant's Exhibit Y.

Mr. Byerly: Your Honor, I object to that. It has the formula on the box which is quite different from the formula given in the Lefferts and Stevens patent. You see, this sample of ink which he has just produced has a formula on the top of it which I assume, although he has not said it, is the formula under which the sample was made. Now that is not the formula contained in the Lefferts and Stevens patent.

Mr. Free: We passed all that yesterday, your Honor, when the witness explained that the ingredients are the same as in Lefferts and Stevens. As Lefferts and Stevens says, you vary the portions wherever (427) necessary to get the viscosity you desire. That is what the witness said yesterday.

The Court: Is there any testimony that that ink would react under the test the same as if it were made exactly in accordance with the Lefferts and Stevens patent?

Mr. Free: Yes.

Mr. Byerly: There is no testimony that I can remember to that effect, your Honor.

Mr. Free: Then I will ask the witness a question about that.

Q. In the Lefferts and Stevens patent which we talked about yesterday there are given the ingredients shown on this container which I offered as Exhibit Y.

The Court: Are you telling him or are you asking him?

Mr. Free: I am asking him the question if those ingredients aren't there, to save time.

A. These ingredients in my formula are to be found in the Lefferts and Stevens patent.

By the Court:

Q. Whereabouts in the patent? A. On page 1, column 2, line 53:

"First, a solvent or a mixture which is a solvent of pyroxyline."

(428) Q. Do you use that? A. Yes.

Q. Then "Second, a pigment or coloring material in powdered form." A. That is chrome yellow pigment.

Q. You use that? A. That is right.

Q. "Third, a gum, gums, or binding agent for holding the particles of pigment together." A. Yes, sir. I use one-half second nitrocellulose, which is a pyroxyline binding agent.

Q. Is there anything else in there not named in the patent? A. Yes: I use castor oil as my plasticizer, which is given on page 2, at line 11.

Q. The first definition on page 1 does not call for a plasticizer, does it? A. No, it does not.

The Court: What do you say about that?

Mr. Free: Well, if your Honor will turn to page 2, line 11, he says, in the first column:

"Castor-oil may also be added to assist in the operation of the gum or gums used as a binder, which further serves to render the ink smooth."

You can add it or not, if you want.

The Court: You mean add it to the other stuff?

Mr. Free: Yes.

The Witness: To make it complete.

The Court: What do you say to that?

Mr. Byerly: There are two formulae given in (429) this Lefferts and Stevens patent. If your Honor will look at page 2, the middle of the second column, it gives an exact formula for plate-printing and on the top of the first column of page 3 he gives a formula for type printing. This formula here is not the same as either one of those. If he wants to say that this is an ink made up from some of the ingredients of the patent, that is one thing, but to say that it is made up in accordance with the patent it seems to me is improper to have as an exhibit here.

The Court: Well, the first page says:

"The ingredients entering into the compound are"——

that certainly is a description of what the patentee had in mind, isn't it? Is that what you are speaking about?

Mr. Byerly: Yes. He mentioned these ingredients, but when he comes to tell how he compounds them he tells specifically how, and the witness has departed from those instructions given on the specific formulas in the patent.

Mr. Free: I think I get Mr. Byerly's thought. I think you mean the proportions may be a little different.

Mr. Byerly: Yes.

Mr. Free: Well, Lefferts says on page 2, column 2, about line 88, your Honor:

(430) "The proportionate quantities of the ingredients used in compounding the ink will depend somewhat upon the nature or character of the printing to be done and upon whether the ink is to be used in plate-printing, type or surface printing."

He can use any proportions he wants.

The Court: He allows a variation.

Mr. Free: Surely.

The Court: I will take it.' Objection overruled.

(Marked Defendant's Exhibit Y.)

By Mr. Free:

Q. Yesterday, Mr. Taylor, at the close of the session I asked you to produce a sample of the petroleum fraction boiling over 250 degrees Centigrade which you made in accordance with the Doughty patent; and you have so produced it here, have you not (handing to witness)? A. Yes This is the sample which you have in your hand.

Q. State whether or not this is a sample of the fraction obtained in the presence of plaintiff's counsel? A. That sample was obtained in the presence of plaintiff's counsel and sealed in their presence.

Mr. Free: I offer in evidence as Defendant's Exhibit Z the sample of high boiling petroleum fraction obtained according to the Doughty patent.

(431) (Marked Defendant's Exhibit Z.)

The Court: What do you call that, an ink?

Mr. Free: No, that is a solvent.

The Court: Just a solvent?

Mr. Free: A petroleum solvent that Doughty describes.

The Court: And where does he describe that?

Mr. Free: That is on the second page, your Honor, at line 16.

The Court: All right.

Q. Now, Mr. Taylor, to give the Court the opportunity of comparing the accused defendant's 502-C oil, shown in Defendant's Exhibit V, with the high boiling petroleum fraction described in the Doughty patent, shown in Defendant's Exhibit Z, will you please break the seals of these two exhibits and compare a little of each in test tubes. By the way, these exhibits were sealed at Cincinnati in the presence of plaintiff's counsel? A. They were.

I now break the seal on the kerosene fraction boiling above 250 degrees Centigrade.

The Court: You mean on the defendant's product? What is that exhibit, Exhibit Z?

Mr. Free: That is the Doughty oil, Exhibit Z, yes, your Honor.

(432) The Court: What is the other one?

Mr. Free: That is Exhibit V, the 502-C oil.

The Witness: I have here two clean test tubes and then in one tube I pour the Doughty kerosene fraction boiling above 250 degrees Centigrade and mark that tube Z. In the second tube I pour a portion of the defendant's 502-C oil and mark this tube V.

Q. Will you hold them both up to the light so that the Court can see the physical color and characteristics of them? A. (Witness complies.) Note the colors are identical, a pale straw yellow.

Q. The kerosene which you distilled Exhibit Z from, was what color? A. A water-white.

Q. Do you know what caused the change of color to straw color? A. The heating causes a change to a light pale yellow in the distillation.

Q. And that is also true of the 502-C oil, is it? A. That is true of the 502-C oil.

Q. Now, I will ask you to pour those samples back in the bottle. A. (Witness complies.)

Mr. Free: I do not think I will mark them in evidence. They are merely taken from the containers.

The Court: What is the value of that, to show that they are alike?

Mr. Free: Yes.

(433) Mr. Byerly: I am willing to concede that the two samples appear similar in color.

Mr. Free: I am simply trying to show that the prior art solvent and our solvent are at least physically alike.

Q. Where did you get the kerosene of which you took a sample by distilling according to the Doughty patent? A. We received this tank car of kerosene from the Pure Oil Company.

Q. Do you have an invoice to show that you obtained it there? A. I do. I got these invoices out of our regular files at the office.

Q. What is the practice in your plant in connection with the purchase of kerosene? A. We buy kerosene in tank car lots according to the market price.

Q. What is the procedure? A. The superintendent of the factory when the kerosene is running low simply sends in a blank order marked "kerosene", and the purchasing agent buys the kerosene from any reputable oil company, depending on the best price.

Q. That is the ordinary commercial kerosene? A. That is the ordinary commercial kerosene.

Q. You took this purchase order and the Pure Oil Company invoice out of the files yourself? A. I got them myself.

(434) Mr. Free: I offer them in evidence as Defendant's Exhibit A-1, the invoice and this order, identifying the kerosene used by the witness to make the solvent according to the Doughty patent.

The Doughty patent says here on this page, line 16:

"I have discovered that certain higher boiling liquid saturated kerosene hydrocarbons, for example those present in fractions of kerosene boiling above

250° C. at normal pressure, may be employed instead of terpineol."

Q. With this fraction of kerosene that you obtained according to the Doughty patent, of which Exhibit V is an example, what can you say about the distillation range of that sample? A. After obtaining this sample of kerosene, the next step was to make certain tests, and the first test was the distillation range. That is according to the A. S. T. M. method.

Q. What is that, briefly? A. That is the American Society for Testing Materials. They have set up a standard method for testing petroleum products. This standard method which I used is used throughout the world, so that a chemist testing kerosene, for example, in New York, will have comparable results with a chemist in some other part of the country.

(4359) Q. What apparatus did you use to determine the distillation range of this Exhibit V substance?

The Court: What is the distillation range?

Q. Will you explain that, Mr. Taylor? A. If you take, for example, three ounces, we will say, of kerosene and place it in a flask and heat it with a slow burner until the first drop starts off, and then take the temperature with a thermometer at that boiling point, and continue the distilling until all of the material has evaporated from your flask, the temperature will continue to rise, and that is known as the distillation range. Kerosene, for example, will start to distill at, we will say, 150 degrees Centigrade, and then the last drop will go out of the still at approximately 300 degrees Centigrade, and that range from 150 to 300 degrees Centigrade is the distillation range.

The Court: What is the difference between that and the vapor pressure?

The Witness: The vapor pressure is the pressure which volatile solvents exert on a closed chamber to evaporate, and the distillation range is the range which shows whether the liquid boils off, we will say, at a low temperature or a high temperature, and is a method of comparing the two liquids.

The Court: What does it prove if the distillation (436) range and it are the same?

The Witness: We have here a kerosene which Doughty taught us to make. In order to determine the properties of this kerosene fraction, we had to run certain tests upon it which we had previously made upon butyl carbitol. One of the tests is the distillation range, another is the vapor pressure.

Q. The idea being to compare the vapor pressure and the distillation range of this Doughty solvent with others, like the defendant's solvent, is that right? A. That is correct.

Q. And also with butyl carbitol? A. That is right.

The Court: Suppose they are the same or different, what does it prove?

Mr. Free: We are trying to show that insofar as this Doughty kerosene fraction is concerned that is the same as our 502-C, which is also a kerosene fraction. The patent in suit sets up certain standards of vapor pressure, and the plaintiff has injected boiling range, or distillation range, in this case, so we are comparing the two of them side by side to show what we used was what was authorized by Doughty.

The Court: What the patent anticipated?

Mr. Free: That is right.

Q. Will you refer to that chart and give me the (437) distillation range of the 502-C oil?

Mr. Free: For the time being I will mark that chart for identification.

(Marked Defendant's Exhibit B-1 for identification.)

A. The distillation range of 502-C oil, first 5 c.c. distilled, starts off at 264 degrees, and the final distillation 291 degrees Centigrade.

Q. What do you make that, Mr. Taylor, at the tail end there? A. It is just a small fraction above 290 degrees Centigrade.

Q. Will you read off the distillation range of the Doughty oil, which is marked 250 oil there, and give us the beginning and end of the range as you determined it? A. The first 5 c.c. reading at 243 and the 95 c.c. reading at 285.

Q. Will you read off also the oil of cloves distillation range shown on this chart? A. Oil of cloves starts 242, the first 5 c.c., and the 95 c.c. oil of cloves 273 degrees Centigrade.

Q. Will you look at butyl carbitol and read off the distillation range of that? A. We have two samples of butyl carbitol marked on the chart, the fresh sample from the Hilton Davis drug, opened in the presence of the plaintiff's counsel, and the sample I received from (438) the plaintiff, from their New York office. The first sample starts at 228, the Hilton Davis sample, and the last 95 c.c. temperature is 231. The sample I received from the plaintiff starts at 225 approximately and ends at the same point as the Hilton Davis sample, namely, 231 degrees Centigrade.

Q. State whether or not the boiling ranges of the Doughty kerosene fraction and oil of cloves are higher than the boiling range of butyl carbitol? A. It can be seen by the chart that they are higher than butyl carbitol.

Mr. Free: I offer in evidence as Defendant's Exhibit B-1 the distillation range chart previously marked for identification.

(Defendant's Exhibit B-1 for identification received in evidence.)

Q. Just to illustrate the apparatus with which you made these tests, which I believe you called A.S.T.M. tests, will you produce a photograph of it? A. (Witness produces photograph.) I have before me the photograph of the standard equipment used for an A.S.T.M. distillation range test.

Mr. Free: I offer in evidence for illustrating the apparatus used by the witness a photograph of the apparatus just produced by the witness, as Defendant's (439) Exhibit C-1.

(Marked Defendant's Exhibit C-1.)

Q. I believe you also said you measured the vapor pressures of the various solvents mentioned by Doughty, and I ask you to show us a chart indicating the vapor pressures at various temperatures, which is marked for identification Defendant's Exhibit D-1.

(Marked Defendant's Exhibit D-1 for identification.)

A. (Producing chart.)

The Court: When you say the Doughty patents, are you referring to more than one patent?

Mr. Free: That should be corrected. Please note for the record that the exhibit should omit patent No. 1,439,695, and I accordingly strike out that number from the chart.

Q. Tell us how you went about obtaining the vapor pressures of these substances shown on this chart, Exhibit D-1 for identification, and to save time you might compare it with the method you used with the Lefferts and Stevens chart. A. I used the same method of determining these vapor pressures that I used in making the Lefferts and Stevens chart, namely, the Brewer and Gardner method. That is the one specified in the Gessler patent. These solvents on this chart are, namely, benzyl alcohol, benzyl acetate, terpineol (440) and butyl carbitol and terpinyl acetate. The vapor pressure of those solvents I have marked under their titles "G" and "B", meaning those determinations were made by Brewer and Gardner.

Q. Will you refer for a moment to Brewer and Gardner and tell us how you checked your results with those of Brewer and Gardner? A. Using the same type of equipment, I checked all of these vapor pressure determinations made by Brewer & Gardner and found that my equipment and their readings checked.

Q. Now I wish you would read off this chart——

Mr. Free: Which I now offer as Defendant's Exhibit D-1.

(Defendant's Exhibit D-1 for identification received in evidence.)

Q. —the vapor pressures of the solvents lying between butyl carbitol and the accused oil, Defendant's 502-C oil at 150 degrees Centigrade. A. At 150 degrees Centigrade we have butyl carbitol at 62 millimeters; terpinyl acetate at 56½ millimeters. The kerosene fraction which I distilled, the vapor determination on that at 150 degrees is 46 millimeters.

Q. How about 502-C oil? A. 502-C oil at 150 degrees is 20 millimeters.

Q. That is, the vapor pressure of terpinyl acetate and (441) the Doughty kerosene fraction is on the order of centimeters, is it not? A. It is.

Q. All you have to do is convert the millimeters into centimeters? A. Vapor pressure readings are given in millimeters.

Q. Now will you read from this chart and give the vapor pressure of the terpinyl acetate and the Doughty kerosene fraction at 100 degrees Centigrade? A. I beg your pardon, did you say terpinyl acetate and kerosene?

Q. That is right. A. Terpinyl acetate at 100 degrees Centigrade has a vapor pressure of 4¼ millimeters. The vapor pressure of 502-C oil at 100 degrees Centigrade is approximately 3 millimeters.

Q. I ask you to compare in the Brewer and Gardner article, referred to in the patent in suit, the curves of butyl carbitol and terpinyl acetate, and do so by means of a chart which I now show you——

Mr. Free: And which I will have marked for identification as Defendant's Exhibit E-1.

(Marked Defendant's Exhibit E-1 for identification.)

A. This chart is an enlargement of the vapor pressure chart given in "Industrial and Engineering Chemistry", February 1937, in an article of Brewer and Gardner, page 180. The original chart which I enlarged was a vapor pressure curve of butyl carbitol. The black (442) dots to be seen on the chart are Brewer and Gardner's calculation for terpinyl acetate. The purpose of this chart is to show that terpinyl acetate and butyl carbitol lie so closely together in vapor pressure that it would be practically impossible to draw a separate curve for either one of the two solvents on the same chart. In other words, they have identical vapor pressure. One will evaporate at the same rate of speed as the other.

Q. Is there a difference between the curves of butyl carbitol and terpinyl acetate as shown in the Brewer and Gardner article? A. There is no difference. You will note

in the article that two separate charts are given, a chart for butyl carbitol and a chart for terpinyl acetate.

Mr. Free: I offer in evidence as Defendant's Exhibit E-1 the terpinyl acetate-butyl carbitol curve described by the witness and obtained from Brewer and Gardner's article.

(Defendant's Exhibit E-1 for identification received in evidence.)

Q. Mr. Taylor, I now show you a print from what purports to be a Montgomery-Ward catalog and bearing your name, your signature, and the date 11-18-42——

Mr. Free: And which I will have marked for identification as Defendant's Exhibit F-1.

(443). (Marked Defendant's Exhibit F-1 for identification.)

Q. —and ask you what you know about it (handing to witness). A. The purpose of this printing—heretofore I have made small proof prints of Lefferts and Stevens ink, the Doughty ink. Then after that we decided we would make a trial run on a standard, large heat-set printing press. These are sheets from our standard run made on such a press.

Q. What ink was used in printing that circular, if you know?

Mr. Byerly: Your Honor, I object unless it is shown that the witness was present at this test. He has not said that, as I remember.

(To witness) Do you have any personal knowledge of it?

The Witness: Yes.

Q. Tell us the whole story, Mr. Taylor. A. I went to Chicago with formulas for inks to be run on heat-set presses in accordance with what I had learned from the prior art.

I went to the Sinclair and Carroll Ink Company and with the aid of Mr. Carroll and their ink matcher we made up four colors: A yellow, a red, a blue and a black, using the knowledge that I had gained from the Doughty patent and from the McElroy patent.

(444) Mr. Free: That is McElroy No. 1,450,692 in Defendant's Exhibit G, your Honor.

The Witness: That is correct, your Honor.

A. (Continuing) I saw these materials selected and weighed and the varnishes made and the inks ground. I was there when the materials were sealed. I followed the materials to the Hall Printing Company, and watched the inks when they were opened and put in the fountain on the press. I was there during the complete run of the inks and stayed with the operation until all of the forms had been printed, and at the completion of the day's work we signed these copies as marked in the right-hand corner.

Q. That is, your signature? A. My signature.

Q. Now describe the press in a little more detail. A. The press was a standard heat-set four-color press of the largest type used in the industry, and at that time the press was in actual operation printing these forms (indicating) for the Montgomery-Ward Christmas Catalog. When we came into the pressroom they cleaned the press thoroughly of the ink they were then using and put on our ink on a clean press and continued with the same paper that they had been using on the Montgomery-Ward Catalog, and went right ahead with their printing using this ink compounded with terpineol, Cumar resin and (445) rosin-oil.

The Court: This is the Doughty ink?

The Witness: Yes, the Doughty and McElroy ink.

The Court: What is McElroy?

Mr. Free: McElroy is patent No. 1,450,692 in Defendant's Exhibit G, your Honor.

The Court: Is that another one of these patents?
Mr. Free: That is another one, yes, your Honor.
The Witness: McElroy adds a plasticizer.

Q. Now you mentioned Cumar as a resin. What is that and where do you find it in the McElroy patent? A. I find that in the McElroy patent on page 2, line 23——

The Court: 23?
The Witness: From line 20 on. He says:
"With 84 per cent of this mixture we incorporate 16 per cent of powdered coumarone resin, e.g., that known under the trade name of 'Cumar'."

Q. What is "Cumar"? Is it a synthetic or natural resin? A. It is a synthetic resin made in the coal-tar industry. McElroy found it a better resin to use than rosin inasmuch as in this heat-set it does not (446) go through a sticky period.

By the Court:

Q. How can you make up an ink from the two patents? Don't they differ a little? A. Very little.

Q. Which was which that you used in printing this Montgomery-Ward Catalog, Doughty or McElroy? A. This was—I would say the McElroy patent, which is an improvement over Doughty.

Q. You made up an ink, then from the McElroy patent, and that is the result? A. That is the result. We ran it on a standard heat-set press.

Q. How many colors did your say there were? A. Four colors.

Q. Black, red, white and—— A. Black, yellow, red and blue on a white heat-set paper.

Q. Where is the blue? A. Right here (indicating).

Q. Well, each color is put on a separate roll? A. Yes.

Q. Put on separately?

By Mr. Free:

Q. Will you describe how that operation is as you witnessed it in Chicago? A. Yes. Each color is put on separately. The yellow goes down, then the blue, then the red and then the black, one following the other on the coats.

(447) The Court: The paper does not have to go back through——

The Witness: No, it runs right through the web. May I point to the diagram (indicating)?

The Court: Yes, I remember that.

Q. They all go one on top of the other, you mean, and one after the other; then, after the ink is applied, the web is run through that heater? A. Yes, and that is just the way they came out, perfectly dry, non-rubbing and free of all odor.

Q. About how many of these Exhibit F-1s were run on that day that you witnessed at Hall's? A. We ran off 18,000 signatures. We ran from one o'clock until about three, I believe, and the Hall Company were perfectly willing that we keep right on through the rest of the day. We felt that the test was successful and I recommended that they shut the press down.

Q. Was there still some ink left? A. We had some ink left and could have run right on through the rest of the day.

Q. What was the condition of the ink in the fountain? A. The ink was in good condition and was cleaned from the fountain and put back in the kits.

Q. What do you mean by "kits"? A. Ink buckets.

The Court: What is the date of this test?

(448) The Witness: November 18, 1942.

Q. Were these signatures in addition to yours, namely, Kerley, Carroll and Maxwell, put on in your presence? A. They were. Mr. Kerley is in charge of the inks at the Hall

Company; Mr. Carroll, of course, worked with me on making the inks, and Mr. Maxwell is in charge of the pressroom, the heat-set pressroom.

Q. Did you get an impression or do you know about the size of the Hall printing plant where this test was conducted? A. I went through the Hall printing plant. I will say that it is the only time I have been there.

Q. How big is it, about? A. Well, the Hall Printing Company is an enormous plant. It covers, I would say, several square blocks. They are printers of Montgomery-Ward catalogs, Sears-Roebuck catalogs and that type of printing.

Mr. Free: I offer in evidence the circular just identified by the witness which he saw printed as Defendant's Exhibit F-1.

The Court: It will be admitted.

(Defendant's Exhibit F-1 for identification received in evidence.)

Q. Now the rosin-oil referred to in the McElroy patent, which is not mentioned in the Doughty patent, I believe, serves what function in the ink with which (449) this Montgomery-Ward circular was run? A. The rosin-oil has a boiling point of about 285 degrees Centigrade, and it served as a double purpose in this heat-set ink. A portion of it was evaporated off as a volatile oil and some tailings remained as a plasticizer in the ink.

Q. And that is to keep the ink soft and not brittle? A. Keep the ink soft and plastic.

Q. And that rosin-oil which did not remain in the ink after it was dried had gone off with the terpineol? A. That is correct.

Q. As the paper was heated? A. Yes, sir.

Q. Did you notice whether or not those heaters on the Hall presses have a hood for carrying off the vapors? A. They do have a hood. I made a special note of that because

during the time we were watching they cleaned the presses and we had some time for discussing the operation of the press, and their press foreman showed me where the vapors were taken out of the building through ducts, normal ventilating ducts.

Q. And did you notice whether or not the ink that was so used fits this description in McElroy, line 33 of the first column, page 2:

> "The ink resulting is of pasty and semi-fluid consistency, similar to that of printing inks generally."

(450) A. That is what we made.

Q. State whether or not you observed this operation to have been conducted at Hall's, as stated in line 99 of the second column of page 2 in the McElroy patent:

> "As will be obvious, however, the ink set forth may be used at lower temperatures, or cold, and the impression artificially dried thereafter."

Was that carried on? A. That was carried on, the artificial drying.

Q. The ink was cold in the fountain? A. Cold in the fountain; passed over the printing rollers and then through the standard gas drier.

Q. Now, Mr. Taylor, will you turn to the Jirousek patent in Defendant's Exhibit G, and I would like to ask you——

> The Court: What patent is that?
>
> Mr. Free: The Jirousek patent. That is the last one in the book I believe, your Honor.
>
> The Court: 1,954,627?
>
> Mr. Free: Yes, sir.

Q. ——and I invite your attention particularly to line 27 of page 1 where it states a paraffin wax is added "although other waxes, as beeswax, Chinese wax, spermaceti, etc. may

be used." And again, on line 62, page 1, second column, (451) he mentions paraffin wax. I would like to ask you what effect the addition of waxes has on the solvent in an ink of this type, heat-set type. A. The addition of a small amount of wax of, say, one-half or one per cent of paraffin wax to the solvent used in heat-setting will slow up the drying to a considerable extent and give the ink a longer press life.

Q. What do you mean by that? A. Simply that if we use a rather low boiling solvent, one that is, for example, lower than butyl carbitol, in the class of toluol, if we should use those inks on a printing they would tend to dry and become gummy on the inking rolls. The addition of a small amount of wax to that solvent will increase the press life tremendously.

Q. What would the addition of wax do to a fast-evaporating solvent? A. To a fast-evaporating solvent, for example, like benzine, the addition of a small amount of paraffin wax will hold that solvent in a fluid condition for sometimes as much as an hour or more.

Q. Have you some way of demonstrating that? A. I do. I have——

The Court: We will take his word for that. Is it necessary to do that?

Mr. Byerly: I think perhaps he had better go a little further, your Honor, because the conditions (452) make a difference.

The Court: All right.

Mr. Free: It is just a quick simple test, your Honor. It will take a minute or so.

A. I have a test tube here which contains a mixture of solvents used by Jirousek, namely, cellosolve 50 parts, toluene 50 parts. In the second tube I have added to the cellosolve and toluene a one-half part of paraffin wax. I would like to demonstrate the difference in the rate of evaporation of these two mixtures of solvents due to the addition of paraffin wax to one of them.

The Court: The wax is in one of them now, isn't it?

The Witness: Yes, the wax is in it.

The Court: In which one?

The Witness: In this one (indicating).

The Court: Well, what are you doing now?

The Witness: This is something that is well known in the printing art, that the addition of wax to a solvent slows up its evaporation rate, and I would like to demonstrate that.

The Court: Well, is that disputed?

Mr. Byerly: Yes, we dispute it.

The Court: Very well.

(453) Mr. Byerly: I mean, we think it requires certain detailed explanation. I do not know that your Honor wants me to go into it now.

Mr. Free: That is why I am doing it, your Honor, because he is objecting to it.

The Court: Very well.

A. To identify the spots of solvent that I placed on the paper, I mark them as they are marked on the tube. The first tube is toluol and cellosolve, which I put on the left-hand side.

The Court: It hasn't any wax in it?

The Witness: This has no wax.

A. (Continuing) On the second side I place the solvent which contains a little wax.

Q. Now I wish you would time the evaporation rate of both of them. A. (Demonstrating.)

Q. You are now waving the paper through the air? A. I fan the paper, of course, to speed up the operation, which has an equal effect on both solvents. It can readily be seen that there is quite a difference, by observing the speed or the rate of evaporation (handing exhibit to Court).

The one on the left——

The Court: That has the wax?

The Witness: That has the wax.

(454) The Court: Then if there is a slow evaporation, that is the one with wax?

The Witness: Yes. That is what you want in printing ink for a long life on a press.

The Court: Show it to the two gentlemen over there.

(Exhibit handed to persons referred to.)

The Witness: The solvent containing no paraffin wax is now practically dry and the solvent containing paraffin wax just smears. It shows very little sign of evaporation.

Q. What time did that occupy? A. According to my watch it took approximately two minutes.

Mr. Free: I think we will leave this sheet of paper out in the air for a while and look at it again later.

The Court: Are you marking that as an exhibit?

Mr. Free: I think there will be nothing left, your Honor, in a day or so, so I think it will be just a demonstration sheet, unless you want to mark it, Mr. Byerly.

Mr. Byerly: No.

Q. Mr. Taylor, yesterday the Court asked you about the solvent of the McElroy patent; will you show whether (455) or not they are solvents for certain resins?

The Court: What is that?

Mr. Free: I thought you asked him whether these Lefferts and Stevens solvents were solvents for resins, and I would like to show you that they are.

The Court: If he says so that will be sufficient.

Q. Now, I would like to ask you to make another demonstration predicated upon the statement which Mr. Bragdon for the plaintiff made, which reads as follows, at page 77 of the record:

"Q. Would you call water and alcohol similar or dissimilar insofar as vapor pressures are concerned? A. I would say they are in about the same class. They would evaporate at about the same rate when exposed in an open vessel."

Do you agree with that statement? A. I do not.

Q. Will you demonstrate what you mean by your disagreement with that statement? A. In order to demonstrate the difference in the rate of evaporation of alcohol and water I take a piece of ordinary hand paper toweling and using ethyl alcohol which I have in a small bottle here, pure grain alcohol, and water in this glass. On one side of the toweling I place some drops of water. I place them on first and give them all the advantage I can of the time of evaporation. (456) On the center of the sheet I place drops of alcohol.

Q. Now, will you time this period and tell me what you are doing? A. Wave this sheet in the air to get a relative rate of evaporation between water and alcohol. I find that the alcohol is evaporating from the paper quite rapidly.

The Court: How do you find that, by its getting dry?

The Witness: By its getting dry.

Q. The alcohol is dry and the water is still wet? A. Yes.

Q. During what period of time? A. That took about 45 seconds.

Q. What causes that difference in evaporation rate? A. The difference is due to the difference in the vapor pressure of the two solvents, water having a lower vapor pressure than alcohol. Water has a vapor pressure at room temperature I believe of 17.6 millimeters, whereas alcohol at room

temperature is 40 millimeters. Alcohol has over twice as great a vapor pressure as water.

Q. What is the difference between the vapor pressure of defendant's 502-C oil and butyl carbitol at 150 degrees? A. At 150 degrees the defendant's 502-C oil is 20 millimeters, whereas the plaintiff's butyl carbitol is in the neighborhood of 60 millimeters at 150 degrees.

(457) Q. The difference is about the same as that between alcohol and water? A. The difference is even greater than between alcohol and water.

Mr. Free: Now, your Honor, yesterday during the discussion of the Lefferts and Stevens patent the question arose as to the substantial identity between the clove oil now and in 1888, so I have obtained here a photostatic copy of the United States Pharmacopoeia for 1882 and a photostatic copy of the same book for 1942, and I would like to read the description of clove oil, first from the 1882 volume of this dictionary.

"Oil of cloves. A volatile oil distilled from cloves. A pale oily thin liquid, becoming darker and thicker by age and exposure to air, having a strongly aromatic odor of cloves, and pungent and spicy taste, and a slightly acid reaction. Specific gravity about 1.050. It is very soluble in alcohol. With an equal volume of a concentrated solution of potassia it forms a semi-solid mass."

In 1942 the same book describing oil of cloves, states:

"Oil of cloves is a volatile oil distilled with steam from the dried flower buds of"—there is a long Latin name I cannot pronounce. Under the (458) heading, however, of oil of cloves the specific gravity given is not less than 1.038 and not more than 1.060 at 25 degrees Centigrade. I would just like to point out that the specific gravity in 1882 was 1.050, which lies well

within the range specified in 1942 of 1.038 and 1.060. The 1942 statement goes on to say:

"Oil of cloves soluble in two volumes of 70 per cent alcohol," and so forth.

I offer in evidence pages 316 and 317 of the 1942 Pharmacopoeia of the United States of America, and page 235 of the 1882 volume of the United States Pharmacopoeia, jointly, as Defendant's Exhibit G-1. I ordered the fly-leaf of each of these but they did not come. I would like permission to add those to the exhibit, because they bear the dates.

(Marked Defendant's Exhibit G-1.)

(Short recess.)

Mr. Free: In further reference to the clove oil test which Mr. Taylor made in accordance with the Lefferts patent, I would like to ask him where he bought the clove oil for that purpose.

The Witness: From Fritzsche Bros., Inc. of New York.

Q. What does that U. S. P. mean on the label? A. That stands for U. S. Pharmacopoeia, which is——

(459) The Court: I know what that is.

Mr. Byerly: Your Honor, in connection with this evaporation of water test, I would like to note on the record, if your Honor will permit it, that during this test the windows of the courtroom were covered with water on the inside, that is, condensed water vapor from the air in the room.

The Court: I noticed that.

Q. Did that make any difference in the evaporation rate of water or alcohol, Mr. Taylor? A. It should not make enough difference to be noticeable. I think we all know that when we come out of a shower covered with water it takes a long time for the water to evaporate, and when we take an alcohol rub-down, as fast as you are rubbed down the

alcohol evaporates from your body. That is just a common sense relationship there.

defendant's accused oil, the 502-C oil? A. The solvents in Lefferts and Stevens have a vapor pressure higher than defendant's solvent 502-C. All of these oils have a higher vapor pressure that defendant's solvent at 150 degrees Centigrade.

Q. State whether or not that would be manifested by the curves of Exhibits P and D-1 for the Lefferts and Stevens and Doughty patents? A. On these two sets of curves plainly it can be seen that the vapor pressure for 502-C particularly is lower than all of the volatile oils mentioned in the prior art patents.

Q. Does the shape of those curves indicate the action of the solvent as the ink is heated? A. Yes; these curves you might say nest one within the other. You will always notice in vapor pressure curves that they have the same general degree of rise in vapor pressure with the temperature.

(463) Q. Is there anything peculiar about that? A. There is nothing peculiar about it. It is a definite law of pressure against the temperature.

Q. Which of the prior art patents which we have discussed here this morning discloses a solvent which forms a stable solution with the resin? A. The prior art solvents which form stable solution with the resins, in Lefferts and Stevens we have oil of cloves and oil of sassafras and oil of cassia. There are three good examples; and nitrobenzole in Lefferts and Stevens. In Doughty terpineol is a very good solvent and makes a very stable ink, as well as benzol alcohol, although I prefer terpineol.

Q. State whether or not you have tried out these solvents with resins to ascertain that they form stable solutions with the resins? A. I have tried all of these solvents, made laboratory solutions with these solvents using nitrocellulose and various resins, to see that they made stable solutions.

Q. Now, I would like to refer you to the Lawrence patent No. 1,858,673 in Exhibit G, and ask you whether

that patent refers to anything which might be called an ink? A. It is an ink.

Q. A transfer compound is a form of ink? A. A form of an ink.

(464) The Court: What do you mean by transfer?

Mr. Free: That is what the patent is called.

Q. Will you describe that, Mr. Taylor? A. A transfer is a rather thick——

The Court: You do not call it an ink, just a transfer? By transfer you mean transfer ink?

The Witness: A transfer printed on cloth, or on paper to be transferred to cloth by means of heat impression.

The Court: You mean they use a cloth as a printing medium in place of a roller?

The Witness: When they put names of teams on sweaters or things like that, they use transfer inks. It is a special type of ink.

Q. Line 33 of the first column of page 2 mentions a formula. Will you tell us after reading that formula what you would get when you mix up those parts? A. Reading from page 2, column 1, line 30, 100 parts of ethyl cellulose, 90 parts of high melting cumar——

Q. Right there, that is some synthetic resin we have been talking about. A. That is one of the cumar resins. Those two ingredients would form a binder. 45 parts of butyl carbitol, 75 parts of ethyl abietate (or Lindol, which is a trade name), and 35 parts of No. 6 lithographic varnish. The ethyl abietate with the varnish would form (465) a plasticizer. The butyl carbitol, of course, would be a solvent. That forms what we have been calling a varnish.

Q. Does any pigment go in that? A. The color is added later.

Clinton Taylor, for Defendant—Direct.

Q. What do you get when you have done all that? A. You mean after adding the color to the varnish?

Q. Yes. A. You get a wavy, buttery like compound.

Q. Comparable to ink or not? A. Comparable, you might say, to a thick base ink that would have to be thinned with more solvent.

Q. Suppose you thinned it with more solvent, what then would you use? A. I think you would use butyl carbitol.

Q. That is the solvent he mentions there? A. That is right.

Q. And would you add more or less solvent as we have heard here for the last several days, to get a thick or thin ink, depending on what you wanted? A. That is correct. When you break down this formula, that is, compare it with the Gessler, you will find that the Lawrence vehicle contains the following as compared with the Gessler vehicle:

The Court: You mean the same thing that Gessler has?

Ans. The Witness: You taking the Gessler vehicle against the Lawrence [illegible]

The Court: What have they in common?

The Witness: Lawrence has a binder of ethyl cellulose, which is a cellulose compound and 90 parts of a resin. He mixes the two together, giving him 140 parts of binder. Gessler's vehicle calls for 120 parts of a binder. I get that number 192 by simply multiplying Gessler's binder by 1.5. He calls for 30 parts. Multiplying that by 1.5 you get 192 parts of binder. Lawrence's binder has 180 parts. Gessler's binder has 120 parts. For binder and plasticizer the vehicles are practically the same. The volatile solvent in Lawrence is very low, only 45 parts, whereas in Gessler it is 300 parts. Therefore I say you would have a thick paste ink and would have to be thinned with some butyl carbitol.

Clinton Taylor, for Defendant—Direct.

Q. Now, will you look at the next Lawrence patent, No. 1,954,450 in Exhibit G. There on page 2, line 22, he mentions butyl carbitol again, which he describes down further in line 30 by its chemical name, diethylene glycol monobutyl ether, having a boiling point of 222. Will you look at that formula and tell us what you would get when you mix that up? A. As in the previous mentioned Lawrence formula, you would have a thick wax like paste. (247) The formulas are alike, that is, the Gessler formula and the Lawrence formula, in so much as they both call for butyl carbitol as a solvent.

> Mr. Lord: I may add, your Honor, that we put the Lawrence patent in not as anticipation but merely [illegible] the state of the art. Butyl carbitol was used in the same way long before Gessler.
>
> The Court: As a solvent?
>
> Mr. Lord: As a solvent in substantially [illegible] the [illegible] that [illegible] but not [illegible] the Gessler [illegible].

Q. Will you [illegible] the Lawrence patent? A. [illegible] I thought I would add.

Q. Which [illegible] A. The Lawrence patent [illegible] Lawrence states that the advantage of using butyl carbitol is that it is a solvent of solid [illegible] in the [illegible]. It [illegible] a sufficiently high boiling point [illegible] has a high vapor pressure at 100 degrees. And he goes on to say, so that it does not [illegible] with sufficient rapidity to [illegible] the [illegible] of the [illegible]. That is on page 2, line 27, column 1.

> Mr. Lord: That is all your Honor. I would like at this time, however, to offer in evidence a certified [illegible] of the application of the Lawrence patent No. 1,954,[illegible] as it was originally filed in the Patent Office.

The Court: The application?

Mr. Free: Yes, just to show that the patent as issued is substantially the same as it was filed in the Patent Office.

The Court: What difference does that make?

Mr. Free: You go to the application. Particularly is that so when the application, as this one was, is co-pending with the patent in suit. The idea merely is to show there was no change, substantial change, unless Mr. Byerly is willing to grant that.

Mr. Byerly: It is stipulated that the specification of Jirousek patent application Serial No. 606,081 as filed in the United States Patent Office April 18, 1932 is the same as the specification of United States patent No. 1,954,627 which issued on said application.

Cross examination by Mr. Byerly:

Q. Mr. Taylor, is this catalog which you produced as part of Exhibit D, that is the Carbide & Carbon Chemicals Corporation catalog of January 1929, on page 13 where butyl carbitol is described, is there any (469) mention of using it either in a lacquer or in an ink? A. Yes, in a lacquer.

Q. Where do you find "lacquer" in that publication? A. Pyroxylin dopes I would term as a type of lacquer.

Q. Would you also call a plastic, which he refers to, a lacquer? A. No, I would not. I think that is something a little thicker than a lacquer.

Q. You notice, however, he says pyroxylin dopes and other plastics, so he evidently considers a dope a plastic, does he not? A. You think of a dope as being a very thick lacquer.

The Court: Do you mean that the man who wrote that felt it was a plastic?

The Witness: That I don't know.

Q. It does say, however, pyroxylin dope and other plastics? A. He does say it, yes.

Q. If you put a nitrocellulose solvent, poured some of it on a piece of celluloid, what happens? A. You will get some solution. It will dissolve.

Q. It will dissolve the celluloid? A. That is right.

Q. This Lefferts patent you have been talking about is directed particularly to an ink for printing on celluloid, is it not? I call your attention—perhaps you will admit that. A. Celluloid and other solid pyroxylin (470) compounds.

Q. There is not a single mention in the patent of an ink for printing on paper, is there? A. There is not, that I can see right offhand.

Q. Isn't the real point of this patent— A. Pardon me, but at line 90, page 2, column 2, it says, "The ink depends somewhat upon the nature or character of the printing to be done."

Q. Is that a mention of paper? A. No, but the nature of your printing would, well, if you are going to print on paper, that would give the nature of the printing, I should think.

Q. I call your attention to page 3, lines 41 to 51, where the inventor endeavored to explain what he really had done. You notice there, do you not, that in referring to the solvent he says that his ink contains a solvent or mixture which is a solvent of the pyroxylin compound, upon which the ink is applied? Page 3, lines 41 to 51, where he says what he has invented. A. Yes.

Q. That is, he says he has invented an ink for printing on pyroxylin compounds, which contains a solvent for the compound that the ink is printed on, is that correct? A. That is correct.

Q. Do any of his inks contain solvents for paper? A. No, they do not. We referred, however, to lacquers (471) and cellophane at the time we brought out this Lefferts and Stevens patent.

Q. But what Lefferts was trying to do was to get an ink which contained a solvent which would penetrate into and hold on to the material he printed on, is that correct? A. That is correct.

Q. Are you familiar with the printing or stamping on celluloid by means of engraved heated plate? A. I have seen it done, yes.

Q. That is not typographic printing from type, is it? A. Just how do you mean? You could have type heated or the type could be—you could be printing from type.

Q. Do you know what the plate printing referred to in this patent meant in 1888? A. Hardly.

Mr. Free: I would like to object to this line of questioning on two grounds. The first one is that this is a patent for an ink, and when we get into processes or paper and how we are going to do it, we are talking about something which is stated to be explicitly in the patent in suit to be another invention. He says the method of printing, line 28 of the second column on page 2, the "method of printing is not claimed herein, as it forms the subject matter of my co-pending application Serial No. 15,944 which is in part a continuation of this application". So when you talk about what you are going (472) to use the ink for, that is immaterial. The second objection I have is that the patent in suit is not limited to printing on paper, because he says in line 33 of the second column, page 2, "The novel ink and process described above are not only capable of utilization in printing upon paper, but they are also adapted for use in making very satisfactory prints upon many other surfaces, such as, for instance, textiles or metallic surfaces, or the lacquered surfaces of cellophane or the like where the production of a satisfactory print has heretofore been much restricted".

The patent therefore is not limited to printing upon paper and the plaintiff is estopped at this stage of the proceedings from trying to limit it to a paper ink. He says, "My ink may be used on anything". I cannot think personally of anything he has omitted here. He says, "paper, cloth, lacquered surfaces, cellophane, metal" and so this line of cross examination——

The Court: Whereabouts in the patent is that?

Mr. Free: At line 33, page 2, column 2.

The Court: The objection is overruled.

Q. I was asking you, Mr. Taylor, whether you were familiar with the process of printing on celluloid with a heat engraved die? A. I am not.

Q. I call your attention to the first paragraph (473) in the second column of page 2 of the Lefferts patent, where he says, about half way down that paragraph:

> "In using this ink for printing from engraved plates we prefer to employ heat and pressure, which are applied to the plate and material, the effect being that the ink partially penetrates the surface of the material."

That is a reference, is it not, to printing with an engraved plate which is heated and pressed hard against the material? A. That is right.

Q. And when he refers to the ink penetrating into the celluloid, that is the action of the solvent in the ink on the celluloid in dissolving the material it is printed on, is that right? A. That is correct.

(474) Q. You will notice a little further down that column, beginning around line 95 he gives a specific formula for plate printing. A. Line what?

Q. Well, starting at line 94. You see there the specific formula for plate printing given in this patent? A. Yes.

Q. That formula contains fusel-oil and wood-spirits, does it not? A. It does.

Q. But what Lefferts was trying to do was to get an ink which contained a solvent which would penetrate into and hold on to the material he printed on, is that correct? A. That is correct.

Q. Are you familiar with the printing or stamping on celluloid by means of engraved heated plate? A. I have seen it done, yes.

Q. That is not typographic printing from type, is it? A. Just now do you mean? You could have type heated or the type could be—you could be printing from type.

Q. Do you know what the plate printing referred to in this patent meant in 1888? A. Hardly.

Mr. Free: I would like to object to this line of questioning on two grounds. The first one is that this is a patent for an ink, and when we get into processes or paper and how we are going to do it, we are talking about something which is stated to be explicitly in the patent in suit to be another invention. He says the method of printing, line 28 of the second column on page 2, the "method of printing is not claimed herein, as it forms the subject matter of my co-pending application Serial No. 15,944 which is in part a continuation of this application". So when you talk about what you are going (472) to use the ink for, that is immaterial. The second objection I have is that the patent in suit is not limited to printing on paper, because he says in line 33 of the second column, page 2, "The novel ink and process described above are not only capable of utilization in printing upon paper, but they are also adapted for use in making very satisfactory prints upon many other surfaces, such as, for instance, textiles or metallic surfaces, or the lacquered surfaces of cellophane or the like where the production of a satisfactory print has heretofore been much restricted".

The patent therefore is not limited to printing upon paper and the plaintiff is estopped at this stage of the proceedings from trying to limit it to a paper ink. He says, "My ink may be used on anything". I cannot think personally of anything he has omitted here. He says, "paper, cloth, lacquered surfaces, cellophane, metal" and so this line of cross examination——

The Court: Whereabouts in the patent is that?

Mr. Free: At line 33, page 2, column 2.

The Court: The objection is overruled.

Q. I was asking you, Mr. Taylor, whether you were familiar with the process of printing on celluloid with a heat engraved die? A. I am not.

Q. I call your attention to the first paragraph (473) in the second column of page 2 of the Lefferts patent, where he says, about half way down that paragraph:

> "In using this ink for printing from engraved plates we prefer to employ heat and pressure which are applied to the plate and material, the effect being that the ink partially penetrates the surface of the material."

That is a reference, is it not, to printing with an engraved plate which is heated and pressed hard against the material? A. That is right.

Q. And when he refers to the ink penetrating into the celluloid, that is the action of the solvent in the ink on the celluloid in dissolving the material it is printed on, is that right? A. That is correct.

(474) Q. You will notice a little further down that column, beginning around line 95 he gives a specific formula for plate printing. A. Line what?

Q. Well, starting at line 94. You see there the specific formula for plate printing given in this patent? A. Yes.

Q. That formula contains fusel-oil and wood-spirits, does it not? A. It does.

it should be. It should run off the chart and not be able to be read.

Q. Look at your Exhibit Q. Will you admit that that is correct? A. That is correct.

Q. And that also shows— A. I would like to have you give it to me.

Q. —the vapor pressure at room temperature.

Mr. Byerly: Do you have one that the witness can use?

Mr. Free: Yes. Here is this one (handing).

Q. Defendant's' Exhibit Q also shows that at room temperature, 20 degrees, the vapor pressure of nitrobenzole is at least ten times that of butyl carbitol, isn't it? A. That is right. This chart shows that correctly.

Q. These other substances referred to in this passage to which I referred, lines 33 to 37, are what are known as essential oils or perfumes, are they not? A. They are (478) essential oils from plants.

Q. They are used as perfumes and medicines, and that sort of thing? A. They are used in medicines and that sort of thing, not in perfumes generally. They are essential oils from plants.

Q. They have a strong characteristic odor? A. They have the strong characteristic odor of the plant.

Q. And they are unsaturated aromatic compounds, are they not? A. They are aromatic compounds, unsaturated.

Q. And their composition is not that of a chemical substance but a mixture of various things, is it not? A. Oh, they are definitely a chemical substance. Each one has its chemical oil. Oil of cloves is a chemical substance probably 85 per cent used. They are a slight mixture, the same as hydrocarbons.

Q. That is, they are mixtures? A. Yes.

Q. They are not pure? A. They are not pure. They are U. S. P. substances.

Clinton Taylor, for Defendant—Cross.

Q. The fact that they have strong odors shows in itself that they evaporate, something comes off of them at room temperature, does it not? A. Naturally. That is true of 502-C oil and butyl carbitol.

Q. Butyl carbitol has very little odor, has it not? A. It has odor of a butyl compound.

Q. In this Pharmacopoeia for some time in the 1880's, (479) which you produced, oil of cloves is said to be "A pale yellow thin liquid, becoming darker and thicker by age and exposure to the air." A. That is right; that is what it says.

Q. That indicates to a certain extent it is unstable on exposure to the air, does it not? A. Well it does not give anything in time. We have no idea of what they mean by the time it would take. If we put it on the shelf and allowed it to stand for years it might break down.

Q. You said something about oil of cloves producing a stable solution with some resins, did you not? A. Yes, stable with any ink I made up.

Q. That is something you did not ascertain from Lefferts and Stevens, did you, because Lefferts states in the first column of the second page, starting at line 54:

> "Oil of cloves may be employed in an ink for use in plate-printing, and combines readily with the other ingredients, but after having stood a length of time exhibits this tendency to separate."

Do you find that tendency in oil of cloves to separate from the other ingredients to which the patent referred? A. You will find a slight tendency of the oil to flow above the top of the ink. This is true of linseed oil, butyl carbitol and most any type of oil in this simple (480) type of formula that I made up.

Q. Now Lefferts goes on to say:

> "When such substance, or other substances exhibiting a like tendency, is employed, castor-oil and

wood-spirits should be omitted and the fusel-oil used in greater proportion."

You see that, do you not? A. I have never been able to find your place. You give the page after the column. Would you give the page first?

Q. On page 2, first column, line 60. A. Yes, I see it.

Q. In other words, the patent distinctly says that oil of cloves is not to be used unless fusel-oil is used with it, does it not? A. There is a tendency that way, but I think that what he has in mind, if you are going to store an ink over a long period of time, he wants you to be careful, that is all.

Q. Well for some reason, at any rate, he leaves oil of cloves out of his list of preferred solvents, does he not? A. He does. You remember I used oil of cassia in my ink, not oil of cloves. I was aware of this.

Q. Now, you made up two inks purporting to be in accordance with this patent, didn't you? A. I made up some inks, and I brought two of them with me.

The Court: We will adjourn until 2:15.

(Recess to 2:15 p. m.)

(481) AFTERNOON SESSION

CLINTON TAYLOR resumed the stand.

Cross examination resumed by Mr. Byerly:

Q. In the Lefferts patent, on page 2, the first column, lines 33 to 37, are all the solvents there referred to as equivalents or interchangeable? A. How would you mean that?

Q. I mean does the patentee indicate any preference for one or the other, or does he list them all as equivalent for his purpose? A. He indicates a preference.

Q. After mentioning his preference, then he lists a number of solvents, doesn't he? A. Yes sir; he lists a number of solvents.

Q. So that his preference does apply to all of them? A. I beg your pardon?

Q. Does he indicate a preference between the different solvents which he lists as preferred solvents? A. Yes, he lists in his preference oil of cassia.

Q. Where do you find he says that? A. He has, for instance, oil of cassia in line 25. He mentions that, and describes that more fully than any of the others.

Q. Does that make you think he prefers oil of cassia to the others? A. He seemed to have that on his mind. That would be my interpretation of his solvents, listed under his solvents.

(482) Q. Would you get the idea from reading this patent that any one of these preferred solvents would work for his purpose? A. You simply take these solvents and go ahead and try them out and select one you like.

Q. You think he simply opens a field for experiment? A. No, he does not. He says for preference he uses the solvent. They would all make an ink, but the ink has to be fitted for whatever purpose you want to use it for.

Q. He was talking about an ink to print on cellophane? A. Then you would use an ink that would bite in the cellophane.

Q. Would you gather from his patents that those solvents are all equivalent for his purpose for a cellophane ink? A. In a general way, yes.

Q. And one of those solvents which he indicates to be an equivalent, nitro-benzole, has a vapor pressure about ten times that of butyl carbitol at 20 degrees Centigrade, has it not? A. It does evaporate faster, yes. They all have varying vapor pressures.

Q. Have you ever measured the vapor pressure of any oil of cassia except this that you did for the purpose of this suit a short time ago? A. No, I have not.

Q. You do not know whether that substance as obtained in different years varies in its vapor pressure? A. These oils are essential oils of natural plants, just (483) the same as linseed oil and rosin-oil. We accept them today as being what they were then.

Q. Linseed oil has not any vapor pressure, has it? A. But it is used in ink. I mean we accept them as natural oils.

Q. And natural oils vary from year to year with differences in the plants, and one thing or another, and the way they are extracted? A. Not so you could measure it very well.

Q. Take your Pharmacopoeia on the oil of cloves. What is the method of getting it out of the plant which is described in the 1888 Pharmacopoeia. Isn't that quite different from the method of getting it out of the plant as described in the recent Pharmacopoeia? A. May I have the recent one?

Q. I think the two are together there.

Mr. Free: I think I should say here I did not ask the witness any questions about this, and Mr. Byerly makes him his own witness by doing so.

Mr. Byerly: I think not. It was your exhibit.

The Court: It is your exhibit. I remember we asked him some questions about it.

A. In 1882 it says, "a volatile oil distilled from cloves". In the latest edition of the U. S. Pharmacopoeia it says "Oil of Cloves is a volatile oil distilled with (484) steam from dried flowered buds.". They are both distilled from cloves.

Q. Is not steaming quite a different process from merely distilling it? A. No, steaming is one of the forms of distilling.

Q. It is different from distilling without steam, which can be done, isn't it?

The Court: That is obvious.

A. It says nothing about distilling it without steam, though.

Q. No, but the earlier one does not mention the use of steam. A. I do not know what they used. They may have used steam. Steam is an old method.

Q. It would change the volatility of the substance whether you took it out with steam or whether you merely heated it and distilled it out? A. You would not merely heat the oil of cloves and distill it out. You would burn the plant, probably. You would not just heat a mass of cloves buds, and just heat them up and try to distill them that way. They do not say in 1888. They simply say about oil distilled from oil of cloves. It could be steam distillation, which is a very old method.

Q. There is nothing there to indicate that they used steam distilling in the 1880's? A. No, we just know that they did from——

(485) Q. How do you know that? A. From literature we have read, on special oils, about the method they used.

Q. You have not produced any literature here that indicated how they made oil of cloves in 1888; other than this Pharmacopoeia, have you? A. No, I have not, but I know that to be a fact.

Q. Know what to be a fact? A. That steam distillation was the method that could have been used.

Q. Oh, it could have been used? A. Yes.

Q. Now you spoke of cellophane similar to celluloid. A. Lacquered cellophane.

Q. Oh, cellophane itself did not come into existence until long after celluloid, did it? A. That is correct.

Q. And cellophane is not soluble in these various liquids the way celluloid is, is it? A. I think your patent says lacquered cellophane.

Q. Will you please answer my question? A. No, it is not soluble. The coating, however, is.

Q. Have you ever seen any commercial product known as moisture-proof cellophane? A. Yes, sir.

Q. Is there any nitrocellulose on the outside of it? A. It is lacquered with a lacquer of nitrocellulose very often.

Q. How thick is that? A. A very thin film.

Q. It would not be thick enough for an ink solvent (486) to bite into and take a hold of the way it does celluloid? A. Yes, it is. It can bite into that film. It does bite into it.

Q. If it does bite into it it would take it right off? A. No, it does not.

Q. You tried that? A. Yes. That is the only way we make cellophane inks, to bite into that lacquered film.

Q. You do not know how thick the film is? A. No sir.

Q. Isn't there usually wax in that film, too? A. That I cannot say. That would be up to the manufacturer who makes the lacquered film. There are many moistureproof cellophane manufacturers.

Q. You produced a sample of ink that you called the Lefferts ink, did you not? A. I did.

Q. That is Defendant's Exhibit Y. I notice there is a formula on the outside of the box. Is that the formula from which you made up the ink? A. That is the formula I used for the ink.

Q. And in that formula you say one-half second nitrocellulose, do you not? A. That is right.

Q. When did one-half second nitrocellulose first come into existence? A. The exact date I couldn't tell you; probably around the time of—oh, I would say the 1900s.

(487) Q. Certainly it was long after 1888, the date of this patent? A. It is a pyroxylin, one form of pyroxylin.

Q. But this pyroxylin which did not exist in 1888? A. Yes; it is partly true.

Q. Well what do you mean by "partly true"? A. Well, pyroxylin, the general form of nitrocellulose can be used in lacquer, and there is just a slight variation in viscosity.

There was probably no need for it in 1888, but it probably could have been made.

Q. But it was not made? A. So far as I know; I couldn't state.

Q. Now the specific formula given for an ink near the top of column 1 of page 3 does not include any nitrocellulose at all, does it, of any sort?

The Court: What patent are you referring to?

Mr. Byerly: This is the Lefferts patent, your Honor, page 3, near the top of the first column, where it gives the formula.

The Court: All right.

Q. There is no pyroxylin or nitrocellulose whatever in that formula, is there? A. No, there is not. I did not use these specific formulas. I varied my formulas to fit the press.

Q. What press were you trying to fit with Defendant's Exhibit Y? A. I used a standard proving press used in (488) all printing ink establishments to test out whether an ink has possibilities of printing.

Q. And in order to fit that press you had to introduce this half-second nitrocellulose which came into being after 1888? A. No, I put that in there simply because Mr. Gessler uses it.

Q. I see. You were drawing on your knowledge of the Gessler patent, as well as what you saw in the Lefferts patent? A. No, simply as a pyroxylin type of nitrocellulose.

Q. But a pyroxylin that did not exist at the time? A. That is right.

Q. I notice that his formula calls for camphor. Did you put any camphor in this ink? A. Not in that one, no.

Q. Have you produced samples of the ink with which Exhibit F-1 was printed? A. No, I did not have those.

Q. Will you please produce them?

Mr. Free: He said he did not have any.

A. I don't have the samples of ink.

Q. You know where they are, don't you? A. Not at present.

The Court: Where are they? Do you know where they are?

The Witness: Well they are probably—so far (489) as I know I left them there at the Sinclair & Carroll Company in Chicago.

Q. Those are the offices of the defendant? A. The offices of the defendant.

Q. These are inks which you made up especially to make evidence for this case, are they not? A. They were inks that I made up to try out to see if these prior art patents would run on a modern heat-set press.

Q. And that was for the testimony you expected to give in this case? A. Yes.

Q. But you have never submitted any samples of these inks which you made up for these purposes to the plaintiff, have you? A. No.

Q. What are the formulas on which these inks were made? A. The formulas are on the cards of the Sinclair & Carroll Company, in their office.

Q. I thought you said you made them up? A. I did. I made them up on their standard formula cards. We made up, you see, over 100 pounds of ink. We ran that through as a regular order.

Q. But you did not bring the formulas on which you made that ink? A. No, I did not.

Q. You haven't got them here? A. I simply witnessed the manufacture and the procedure through the plant and the printing and the final delivery of those signatures.

(490) Q. Was any representative of the plaintiff present during this printing? A. Mr. Carroll, I think.

Q. He is with the defendant, isn't he? A. No, the defendant—excuse me, I am sorry—no, no witness for the plaintiff.

Mr. Byerly: Your Honor, I would like to move to strike out Exhibit F-1, as I think it is obviously an ex parte test, and unless the inks, or at least the formulas, are submitted to us it is impossible to cross-examine him about them.

Mr. Free: Ex parte tests are all right, your Honor. He can ask about them all he likes. He said he merely witnessed the mixing of the inks and the running of the inks.

The Court: Do you want him to produce these inks?

Mr. Byerly: Yes, I do.

The Court: Can you get them?

Mr. Free: I will, if they are still in existence. I do not know that, your Honor. I do not know myself right now whether they are or not.

Mr. Byerly: Certainly the formulas are.

The Court: Certainly you ought to have the formulas.

Mr. Free: Yes.

(491) The Court: All right; do that.

Mr. Free: I will; yes, sir.

Mr. Byerly: I still think, your Honor, that the exhibit has not been proved, and in the absence of any information as to the formulas of the inks printed that it is just——

The Court: You renew your motion if they fail to produce it. I will consider it then.

Q. Look at this Doughty patent. Are you familiar with the art of hot stamping book-bindings? A. I have seen it done, yes.

The Court: Hot stamping?

Mr. Byerly: Hot stamping, yes.

Q. It is done with a heated die, is it not? A. That is right.

Q. That is, the heat is applied to the same thing that would ordinarily be the type, the thing that puts the ink on is heated? A. Yes, heated in order to get rid of the solvent.

Q. And it is pressed down. The ink is held down between the heated die and the cloth on which it is printed, is it not? A. So far as I know, yes.

Q. Now Doughty states that the ink which he is making in this patent is particularly for this hot stamping method, does he not? A. Well no, that is not particularly (492) or exactly true, because in the same sentence he says:

> "The ink described, though particularly suitable for book-binders' use, will serve other purposes of decorative printing."

Q. Well that might be stamping gold marks on something besides books, I suppose. That would be decorative printing, wouldn't it?

> Mr. Free: I object to that. He is not competent to answer that question. That is pure speculation.
>
> The Court: Overruled.
>
> The Witness: What is the question?

Q. (Read.) A. Well we don't know. That could be on paper, or fancy books. It is hard to say from this.

Q. Look at the second paragraph of the specifications. We find there a reference to metallic pigment inks. A. What page is that?

Q. That is the first page, the second paragraph of the specification. A. Yes.

Q. There he says that the invention relates "particularly to metallic pigment inks suitable for use in stamping titles and decorative designs on book-bindings". Now in the next paragraph he describes the difficulties encountered in stamping gold book-bindings, does he not? A. Yes.

Q. And on the same page, at line 61, he refers to (493) "application of heat to the type or die", does he not? A. To "permit rapid drying of the ink by the application of heat to the type or die".

Q. And at page 2, the top of the second column, he says:

> "It dries rapidly, however, when applied with a heated die."
>
> The Court: Where is that?
>
> Mr. Byerly: Page 2, the top of the second column, sir.

A. Well, he simply mentions you have to have a volatile solvent to leave your heated die.

Q. Well it indicates that a heated die is to be used? A. In the second paragraph, you left out where he says "for other purposes to which the ink may be adapted".

Q. I show you patent No. 1,460,391 to Sidney Satenstein. Does this patent show a hot stamping machine? A. Method of stamping book-bindings, and the like. I have never seen the patent.

Q. Can you tell by looking at it whether it shows a stamping machine in which the die or type is heated electrically? A. I can see it is a stamping machine. It appears to be heated electrically. I have not read the patent.

(494) Q. This patent is issued to the same company as the Doughty patent, isn't it? A. Both to Alchemic Gold.

Q. And referring to the ink to be used on this hot stamping machine, does the Satenstein patent refer at page 1, line 86, to an application by Doughty? A. It refers to an application by Doughty, Serial No. 521,469, but that is not the same Doughty.

Q. Read his description of what that Doughty application discloses, and see if it is substantially the same as what you found in the Doughty patent.

> Mr. Free: There seems to be no connection with the Doughty patent we referred to this morning here.

I do not see how it is relevant or material. Again, it has to do with method that is excluded in the patent in suit. The patent in suit is for an ink and not for any method.

The Court: Some of these are anticipation patents, I doubt whether they refer to any inks or not.

The Witness: This is a different patent and a different serial number than the one we have before us. I do not know what this patent is for.

The Court: It is pretty hard to hand a patent to a witness and ask him what is in it, if he had not read it.

Mr. Byerly: I think so, but I thought if he (495) read the passage to which I directed his attention——

The Court: Point out to him the change you mean.

Mr. Free: I think Mr. Byerly ought to put the whole patent in, and it would speak for itself.

The Court: Put in as far as your cross examination goes.

Mr. Byerly: I am willing to do that.

(Deemed marked Plaintiff's Exhibit 33.)

Q. In referring to the ink to be used on this hot stamping machine, this patent states:

"Such an ink is disclosed in the co-pending application of Howard Waters Doughty, Serial No. 521,169, and consists in accordance with the disclosure of that application of a metallic pigment suspended in a vehicle which comprises a resinous substance and a high boiling hydro-carbon derivative as a solvent for the resinous substance."

Did you find an ink of that kind described in the Doughty patent about which you were testifying? A. Yes, there

is an ink of that nature. The Doughty patent that I have gives your the right to make various changes in that type of ink, however, just as in the Gessler patent.

Mr. Byerly: I move to strike out these remarks (496) as purely argumentative.

The Court: I think they were called for by the question. The motion is denied.

The Witness: The Doughty patent that I have before me calls for—he gives you a type of formula he is interested in, but he also says that you may make various changes in the details of the invention. Gessler does the same thing in his patent when he gives you one type of formula and then states to you you may make various changes to suit your paper, and Mr. Gessler said that you have to change an ink to fit the paper, to put the press and to fit the conditions under which you are changing. Every ink man knows that, that you cannot take a formula and just simply go into a press room and expect to print it as written. You have to make changes.

Q. And I suppose it is even more true that if you take a patent describing an ink for heat-stamping of book-bindings you cannot expect to take that ink into a print shop and print it on ordinary paper like an ink for that purpose? A. You cannot. It simply teaches you that the solvent used will evaporate from a heated die, which is comparable to a heated piece of paper.

Q. Let us see if that is so. On page 1, line 69, referring to Doughty, he says:

"Preferably the boiling point of the selected (497) medium should be between 200 and 300° C."

Now do you know enough about heat-drying inks used in ordinary printing to know whether every solvent whose boiling point is between 200 and 300 degrees Centigrade

would be successful in such use? A. Down to 200 I would say you were too low. Butyl carbitol is at 222. These are simply lower and upper limits. Between that you would have a range of solvents that could be used in that ink.

Q. But the range would be so broad it would include a lot that could not be used? A. That would depend on the type of press you are using entirely. These things depend on the type of press you are using and the type of printing.

Q. Beginning with line 84, or perhaps line 83, he refers to various solvents, does he not? A. Yes.

Q. After first referring to terpineol, he then goes ahead and says "Other suitable solvents". A. That is right.

Q. You understand from that he means that those are suitable solvents to be used in applying ink with a heated die? A. I simply understand that those are solvents which have boiling points between 200 and 300, which he has stated up above, and now he is giving you a list of those solvents that you might try. Terpinyl acetate has (498) the same vapor pressure as butyl carbitol.

Q. And the others have different vapor pressures? A. They do.

Q. And Doughty draws no distinction between them, does he? For his purpose they are all equivalen ? A. That is for the printer. He is taking this for the type of work he wants to do and how hot his press gets.

Q. I am talking about what the patent indicates. Does not the patent indicate that for whatever purpose the patentee had in mind these solvents are all equivalents that he lists there? A. I do not think you can take that viewpoint.

Q. That is, from later information you have received you think that some distinction should be drawn between the solvents which Doughty mentions as equivalents? A. They all have about the same properties as far as evaporation. Some evaporate slightly faster than others.

Q. In your chart Exhibit D-1 you referred to a number of Doughty solvents? A. That is right.

Q. Is this chart made up like your other charts with curved lines from a chart that had straight lines on it, a logarithmic chart? A. That chart should be read along with the logarithmic chart.

Q. Did you introduce the logarithmic chart of these (499) substances? A. Oh, yes, sir.

Q. I do not like to contradict you, but I do not remember seeing one. If you have it here I should like to see it. A. I have it.

Mr. Free: Well, I thought we did.

Mr. Byerly: Was that introduced?

Mr. Free: I do not think we did introduce it, but we will. We meant to. I will offer it now. You made this chart, Mr. Taylor?

The Witness: Yes.

Mr. Free: From the same data from which Exhibit D-1 was made?

The Witness: That is right.

Mr. Free: I offer that in evidence as Defendant's Exhibit I-1.

(Marked Defendant's Exhibit I-1.)

The Court: Isn't this the one I called attention to, as to the fact that you said "patents" instead of "patent".

Mr. Free: It was the other one. The same thing applies there. We will strike out one of those patents.

Q. Referring to Exhibit I-1, that shows that benzyl acetate and benzyl alcohol have vapor pressures at room temperature at least five times as great as that of butyl carbitol at room temperature, does it not? A. Yes.

Q. And yet, so far as the Doughty patent indicates, (500) without any reference to outside information, those solvents are equivalent to the other solvents he mentions, are they not?

Mr. Free: I think the record ought to show that by "equivalent" you mean the chemical equivalent, not the equivalent in the sense of the legal term.

Mr. Byerly: I mean equivalent in the sense that they are usable for Doughty's purpose, according to his patent, whatever that was.

A. They are usable for his purpose, depending on the type of ink he wants. If he wanted one that evaporates rapidly he would put in benzyl acetate. If he wanted to slow down his evaporation of his solvent he would use terpineol.

Q. That is your interpretation of what he would do. There is nothing to that effect in his patent, is there? A. Well, when he says these various changes may be made that is what people familiar with the art—and they are the ones to read the patents—I assume would naturally do, adjust an ink to fit their conditions.

Q. Look at page 2, line 40, where he tells how to make this ink—4 parts of solvent terpineol or benzyl alcohol, for example. He does not indicate there any preference between one or the other, does he? A. No, he gives you a choice there. He gives you two solvents to use.

(501) Q. When you made up a sample of this ink you selected terpineol, did you not? A. I did.

Q. And that has a lower vapor pressure at room temperature than benzyl alcohol, hasn't it? A. Yes, considerably lower than benzyl alcohol.

Q. Did you make any ink vehicle in the proportions which are given here in the example, that is, 4 parts of the solvent terpineol and benzyl alcohol to 1 part of ordinary resin? A. Yes; when I used metallic pigments I used the exact formula and found it to be very good.

Q. Have you a sample of that ink here? A. No, I have the prints which I exhibited.

Q. It was much thicker than ordinary printing ink? A. No, it was the same consistency as the ink I submitted.

Q. Which was the ink that you submitted? A. Chrome yellow pigment made out of lead is very much heavier than aluminum pigment. The formula had to be varied in accordance with the pigment used.

Q. You have not any sample metal pigment made according to the proportions given in the patent? A. No, I simply say that it made a good print and ran very well in the press.

Q. Did you dry it on a hot die, to see if it would work on that? A. I was not interested in a hot die. I ran it on a typical proof press, and then heat-dried it and drove off the terpineol, just as I did in court.

(502) The Court: Just answer the question.

Q. (Read.) A. No.

Q. Then when you made other inks with a different viscosity you were not seeking to get the right viscosity for use with a hot die, were you? A. No.

Q. You say you have made up an ink, I think in accordance with the McElroy patent, have you? A. Yes.

Q. That is the ink you have not produced here, isn't it? A. That is the ink I have not produced.

Q. I call your attention to the first column of the second page of the McElroy patent, line 46, in which it is said: "However, 20 per cent of 'cumar' to 80 per cent of the solvent vehicle forms an ink which at certain temperatures tends to clog the impression member."

In the inks which you made did you use over 80 per cent of solvents?

The Court: The "impression" is the printing member?

The Witness: Yes. You are speaking of inks I made for the Chicago run?

Q. Did you make any other inks under this patent? A. Oh, yes, for testing I have made several inks.

Q. You have not produced any of them here? A. No.

Q. Have you adhered to this part of the disclosure which calls attention to the fact that there should be at least 80 (502-a) per cent of solvents? A. No, I varied the ink to fit the press.

Q. That is you did just the opposite from what the patent said in this respect? A. I cannot remember exactly what the formula is. When we bring the formula card in we will have that.

Q. But you are pretty sure there was not 80 per cent of solvent? A. I am not sure.

Q. What is the boiling point of terpineol? A. The boiling point of terpineol, I would have to look in the handbook, but it would be less than butyl carbitol. I can not give you the exact figure.

Q. It would be over 200 Centigrade? A. It would be in the neighborhood of 200 Centigrade.

Q. I call your attention to page 2, second column, line 99, in which it is stated:

> "Preferably, therefore, the described composition should be used as an ink at a temperature substantially that of the boiling point of the solvent vehicle."

That means that this ink should be employed with a die heated to something over 200 degrees Centigrade, doesn't it? A. In the neighborhood of that.

Q. And you did not try applying this ink to a die heated to about 200 degrees Centigrade? A. No.

(503) Q. Going back to the Lefferts patent for a minute, have you ever heard of any commercial use of any commercial ink, that is, I mean an ink that is on the market or has been on the market, which has a solvent consisting of any of the substances listed in the Lefferts patent as solvents? A. The only one we use is oil of cloves at the present time in small amounts in printing ink.

Q. Now oil of cloves is used in the linseed oil-type of ink, isn't it? A. That is right.

Q. And it is used as an anti-oxidant, not as a solvent? A. That is right. It is to prevent the ink from drying on the rolls, that is right.

Q. And the linseed oil ink dries by absorbing oxygen, does it not? A. That is right.

Q. And really oil of cloves has been found to delay the oxidization of linseed oil ink? A. Yes.

Q. There is no suggestion of anything like that in the Lefferts patent, is there? A. No, sir.

Q. And that is entirely different from using oil of cloves as a solvent, isn't it? A. Yes.

The Court: Wouldn't the two uses conflict?

The Witness: What do you mean?

The Court: I mean to put it in as a solvent hurries the evaporation?

The Witness: It would help to drive off the (504) vapor.

The Court: And the other use is to use it for what?

The Witness: Keep the ink from drying on the rolls at room temperature.

The Court: If you drive it off with heat then it dries quickly?

The Witness: Yes.

Q. In the ink where it is used as an anti-oxidant it is only a minor portion of the ink, isn't it? A. A small portion.

The Court: If you use it as a solvent you use a much larger quantity?

Mr. Byerly: Yes.

Your Honor, I hope you will pardon me for a minute. This examination was quite long—

The Court: That is all right, take all the time you need.

Q. Now you have referred, in connection with the Doughty patent, to making a kerosene cut, have you not? A. Yes, sir.

Q. And that you base on page 2, line 15 and following? A. Yes, that paragraph.

Q. As I remember it you said this morning—you produced a bill and said this was some kerosene that (505) you had bought in 1942, wasn't it, the kerosene you had used? A. Yes, 1942 kerosene.

Q. How does the 1942 kerosene compare with kerosene used at the time of the Doughty patent? A. 1922?

Q. Yes. A. Substantially they are practically the same. Kerosene was a cut made from petroleum to be used in kerosene lamps. They cut off the higher fraction, the gasoline fraction, so that the lamp would not cause explosions when one would attempt to light it. They cut off the heavier fraction so that the wick would not smoke. Therefore they had a fraction in there known as the kerosene fraction which since 1922 has been changed very slightly.

The Court: The top that they cut off for the gasoline is the volatile part?

Mr. Byerly: Yes.

The Witness: Yes. That would cause an explosion in the chimney if they leave gasoline in the kerosene.

The Court: Yes.

The Witness: That was true back in 1880 or 1870. In order to get rid of the gasoline, before the automobile came into existence, they used to do away with the gasoline—they had to pass a law to get rid of the gasoline out of the kerosene, to prevent fire.

The Court: What did they do with it?

(506) The Witness: They poured it down the sewers, I guess.

Q. How about the other end of the kerosene? A. The upper end?

Q. Yes. A. The heavier oil has been cleaned up a little bit for one reason. The kerosene lamp went out—the major portion of kerosene today is used in incubators. To prevent any smoking of the wick they cut the upper fraction off from the heavier part of the oil; just cleaned the kerosene slightly to prevent any smoking in incubators.

Q. What was the upper end of the boiling range of the kerosene you bought in 1942? A. That was 560 degrees Fahrenheit.

Q. I show you a photostat of a pamphlet published by the Government Printing Office in 1921, effective December 29, 1920—I guess it must have been reprinted in 1921—giving the specifications for burning oils. I call your attention to the item "Distillation" under the specifications for kerosene. It states there that an end point of 625 is allowed, does it not (handing to witness)? A. "It shall not be higher than 625."

Q. And what was your present kerosene? What was the end point? A. 560. They state under 625.

Q. Well, "under"—that is a good 1942 kerosene, but (507) it certainly was different from what the Government specification allowed in 1920, wasn't it? A. This is the upper limit they allowed. In 1922 we don't know how low the companies would cut the kerosene. They may have cut it to 600 or 560 in 1922.

Q. That is something you have not looked into? A. Yes. We have distillation ranges of 1922 showing that the kerosene was cut lower. The distillation range is lower than 620.

Q. Where did you get those ranges? A. We have the books with us.

Mr. Byerly: I will offer in evidence a copy of the pamphlet which I just showed the witness, which is

entitled "Report of Committee on Standardization of Petroleum Specifications, Bulletin No. 5."

(Marked Plaintiff's Exhibit 34.)

Mr. Free: May I hear the question on the book?

(Record read.)

Q. Now I call your attention to another pamphlet marked "Department of The Interior, United States Government Specification for Lubricants and Fuel Oil, Government Printing Office, 1924."

This Government Specification also gives the end point of the boiling range of kerosene. It states, does it not, that the end point "shall not be higher than (508) 625 F." A. Not higher than 625. That is the upper limit.

May I see that again, please?

Q. Yes, surely (handing). A. We are speaking about two different things here. You have here the end point "shall not be higher than 625 F.". The charts I showed you are the distillation range, and I read them at 95%. That 560° F. which I gave is the distillation range. The temperature at which the last 95 c. c. goes off. This photostat of the plaintiff is a final end point where the very last drop leaves the equipment. I am not sure that they are comparable.

Q. You did not determine the end point of your kerosene, then? A. No, I did not. I have used A. S. T. M. methods, and when we reached 95 c. c. of kerosene distilled over, I took that as my temperature, 560° F. It is a standard distillation method.

Mr. Byerly: I will offer in evidence the United States Government Specifications shown to the witness.

Mr. Free: I object to that, your Honor. It does not prove anything. It is too indefinite. It just says the upper limits shall be thus and so. It does not prove what was the limit.

The Court: That does not prove what the limits (509) are.

Mr. Byerly: It shows the progress of the kerosene which this gentleman used over the kerosene which Doughty had in mind in 1922. We shall point out as we go on that it makes a very considerable difference in the vapor pressure.

The Court: Objection overruled.

(Marked Plaintiff's Exhibit 35.)

Q. I now call your attention to a photostat of page 758 of a book entitled "Petroleum" by Sir Boverton Redwood, published in London in 1922. Do you find data as to the boiling range of American kerosene in the upper part of this page (handing to witness)? A. I don't quite understand the question. This simply says "an American oil" here.

Q. The paragraph underneath it says "American kerosene", does it not? I mean, right under the table. A. Yes, I see it. I did not read it.

Q. And the distillation range is given or some indication of it? A. 150 to 270 on the American kerosene.

Q. Is that Fahrenheit or Centigrade? A. Centigrade.

Q. The table indicates, does it not, that on American kerosene No. 1 39 per cent of it boiled above 270 Centigrade? A. Of this kerosene, yes.

(510) Q. And if you had taken a part of this kerosene which boils above 250 Centigrade you would have had a much wider cut than you obtained by distilling the 1942 kerosene at 250 Centigrade, wouldn't you? A. We would have had a slightly wider cut. I think they give 39 per cent. I got about 25 per cent.

Q. 25 per cent above 270? A. Oh, excuse me—when I made my cut, above 250.

Q. Certainly your kerosene was not 25 per cent above 270? A. No. We have no idea where that kerosene came

from. It was given to me. It is one of the American kerosenes.

Q. In 1922? A. Yes.

Q. Now I wonder if your recollection is correct. As I remember it when we were out in Cincinnati you only got 20 per cent over 250 in your distillation? A. Well, I think we made a rough guess at that. I don't remember whether we measured it or looked at the still. We said about 20 or 25.

Q. Now non-uniform material, such as kerosene, with a fairly wide boiling range changes its vapor pressure during evaporation, does it not? A. Yes, when they are distilling.

Q. In this apparatus you used—called the Ramsey and Young—you do some distilling of the material while you are (511) measuring the vapor pressure, don't you? A. Very little. I have a close cut kerosene there.

Q. I was talking about the machine in which you measured vapor pressures, according to the Ramsey and Young method. Is that what you were thinking of? A. Yes. There is very little distilling.

Q. When you were using this machine, shown in Defendant's Exhibit E-3, to measure vapor pressures, the part of the liquid which was distilled off during the measurements was collected in this trap marked E which was surrounded by ice, wasn't it? A. If any liquids had been distilled off it would have been entrapped in the vessel E.

Q. You did not measure the proportion of the liquid which was trapped in that vessel, did you? A. Yes. I opened that vessel and withdrew the liquid that had been distilled over during previous vapor pressure runs and found it to be less than 4 c.c. of liquid in that flask E.

Q. And that related to distillation runs of a number of different materials at different times? A. That was many runs of vapor pressure tests.

Q. So you did not in any one run determine the proportion that was distilled over into the flask? A. I did not. It would be very small.

Q. Then if you were distilling a material with a (512) wide cut on that machine the vapor pressure you would get would be the vapor pressure that that material had before any appreciable amount of it had boiled away or distilled away? A. In the first place I did not take any vapor pressure of any materials with a normal wide cut, if you are referring to kerosene.

Q. I am asking you whether that would be the effect of that method if you did try to measure the vapor pressure of a wide cut material. A. There would be some slight tendency that way. Your wick is constantly wet with new material from the bottom of the tube A, however, and you introduce fresh material—you may introduce it at every reading or before every new reading, if you care to.

Q. Well, what I mean is, what you would be measuring would be the vapor pressure of the material before any substantial amount of it had distilled, is that correct? A. That is correct.

Q. That is, you would get no indication whatever of what would be the vapor pressure of that material after half of it had evaporated, let us say? A. No, you get the vapor pressure of the total material.

Q. Yes. You do not get any indication as to what that vapor pressure is as the material is evaporating? A. No. You get it only as the material recedes, the (513) material that you have.

The Court: I think we will take a recess for ten minutes.

(Short recess.)

Q. Will you now look at the Jirousek patent.

The Court: Which one it that?

Mr. Byerly: I think Mr. Free said it was the last one in the book—No. 1,954,627.

Q. (Continuing) I call your attention to the formula given in the Jirousek patent beginning at line 53 of the first page and ending at line 70 of the first page. Which of the ingredients of that ink are liquid? A. Linseed oil, rosin-oil, kerosene; here is copal varnish, 55 per cent mineral spirits, and 76 benzyl alcohol.

Q. Which of the things in that ink would you call solvents? A. Benzyl alcohol, kerosene and the linseed oil. There are two types of solvents, one volatile and one non-volatile.

The Court: Any liquid is a solvent, isn't it?

The Witness: In a compatible ink formula a liquid is a solvent.

Q. Are not some ink vehicles made of linseed oil and nothing else? A. Oh, yes, sir, linseed oil, yes.

Q. What is the linseed oil a solvent for in those inks? A. In that case there is nothing in there for the (514) linseed to dissolve. There is no resin in there, but it would be a solvent.

Q. But in an ordinary old-fashioned linseed oil ink where you just disperse the pigment in linseed oil, the linseed oil is not a solvent for anything that is in the ink, is it? A. It is a carrier for the pigment.

Q. And the linseed oil eventually oxidizes and hardens itself, doesn't it? It does not leave something else to harden? A. That is correct.

By the Court:

Q. Will an oil as it oxidizes dry out and become thick, or how does it act? A. When linseed oil dries out it becomes in the form of a rubbery film.

Q. It gradually hardens? A. Similar I would say to linoleum. It has flexibility to it.

Q. Will any oil act that way? A. Of the drying oils linseed oil is the most important.

Q. Will olive oil act the same? A. No, olive oil and cottonseed oil are non-drying oils. They do not evaporate, and if allowed to stand on a glass plate they will be sticky for months or perhaps even years after.

By Mr. Byerly:

Q. Referring now to the volatile solvent in the Jirousek ink, do you know what the vapor pressure of that solvent is at room temperature, that is, a mixture of (515) benzyl alcohol, mineral spirits and kerosene in the proportions which he mixes them? A. No, I do not, not in that example.

Q. Would you be surprised to find that it is 290 times the vapor pressure of butyl carbitol at room temperature? A. No.

Q. The volatile solvents, the total amount of them present in that ink, amount to not more than half the amount of linseed oil present in the ink, do they? A. I have not added them up. I do not know. I would have to break that formula down.

Q. I thought perhaps you had done that. A. I do not have it with me.

Q. I have broken it down, but I do not want to give you my figures if you can get your own. A. What is the per cent of linseed oil?

Q. I find 40 per cent of the ink is linseed oil and 21 per cent of it is solvent, is that about what you get? A. What are you calling solvents there?

Q. I am adding together the benzyl alcohol, the mineral spirits and the kerosene, which I think you said was a solvent. A. That is right. Did I mention resin?

Q. I do not know whether you did. There is only 1.7 per cent of resin. Then you do not dispute my statement that the volatile solvents are present in (516) about half the amount of the linseed oil present?

The Witness: Your Honor, should I take the time to break this down?

Clinton Taylor, for Defendant—Cross.

The Court. How long would it take?

The Witness. Oh, a few minutes.

The Court. Well, go ahead and let us get rid of it. You do not care to give him your figures?

Mr. Ricketts. I am perfectly willing to give him those figures.

The Witness. Rosin oil could be a solvent, but in a small manner. I am satisfied with those figures.

The Witness: This paper passes over a hot flame or the like. —

The Court: The ink is stamped onto the paper, and as long as the paper is damp, whether it is with linseed oil or ink or whatever it is, your ink is not dry?

The Witness: It is not dry, no.

The Court: It couldn't help to have the paper.

The Witness: Yes, like in a news ink, all of your oil is absorbed into the paper and none of it dries by oxidation.

(519) on to something else? A. Yes, you have it come off the paper, but when it goes onto cloth, of course, you want it to dry, and you dry it with heat, with an iron.

Q. Both of these Lawrence patents mention butyl carbitol? A. Yes.

Q. Take patent No. 1,954,450, page 2, line 130——

The Court: That is Lawrence?

Mr. Byerly: That is Lawrence. There are two Lawrence patents, but this is the number I gave No. 1,954,450.

Q. At line 130 he gives a number of materials which, for his purpose in making a transfer, he says may be substituted for butyl carbitol, is that correct? At 130 there is a list of materials there? A. That is what he says, yes, that is correct.

Q. Those materials do not all have the same vapor pressure as butyl carbitol, do they? A. No, they all are medium high boiling solvents. They evaporate slowly at room temperature.

Q. Do you know how the vapor pressure of those solvents compares with that of butyl carbitol at room temperature? A. Only the nitro-benzole and the diethylene glycol are the only two that we have been interested in.

Q. The nitro-benzole I think you mentioned that before (520) as being ten times that of butyl carbitol, haven't you? A. That is at room temperature?

Q. Yes. A. At room temperature butyl carbitol does not evaporate, and nitro-benzole evaporates ten times faster than butyl carbitol, which does not evaporate at all. I do not know what that would make.

Q. Did you get the impression that this patentee did not know what vapor pressure was, or did he seem to understand it? A. He evidently understood it, but either he or whoever wrote the patent made some errors in the method of writing up some of his vapor pressure sentences.

Q. In the first column on page 2, about line 72, a high vapor pressure is referred to as causing a slow evaporation, isn't it? A. He calls that a high vapor pressure at 100 degrees C.

Q. So that it does not evaporate with sufficient rapidity, and so forth. In other words, he certainly gives the impression there, does he not, that a high vapor pressure means slow evaporation? A. Yes.

Q. And that is the reverse of the fact, isn't it? A. Yes.

The Court: What does he mean, that that is a solvent for that particular material? Does it mean that some things won't act as a solvent for solid materials?

Mr. Byerly: I presume he means it is a solvent (521) for the particular materials he is using.

The Court: In other words, he limits it to butyl carbitol for that purpose?

Mr. Byerly: I do not think he means that, because in the very next column he gives that list of other materials that may be substituted for it.

Q. How much of your time since you got out of school have you been devoting to printing ink? A. Oh, that is, I would say, 75 per cent of it.

Q. 5 per cent? A. 75.

Q. Oh, 75.

The Court: You mean you have worked in a press-room or in a factory?

The Witness: In an ink factory, making inks for printing companies.

Q. That was in the nature of research work? A. Research manufacture, everything clear through the whole plant.

Q. Does your company sell printing inks? A. We do.

Q. Do you also sell printing ink varnishes? A. We do.

Q. Is this that I now show you one of your recent catalogs? A. Yes, it is 1941, not so recent.

Q. I notice on page 54 of this catalog of your company there is a list of so-called heat-set varnishes, is that (522) correct? A. That is right.

Q. And those are varnishes to be used in this heat-set type of work which the Gessler patent relates to, are they not? A. In a general way.

Q. What is the solvent used in the first varnish referred to there, No. 321? A. There is no solvent given here.

Q. Don't you know? A. I do not know in 1941 what we did put in 321.

Q. Was it butyl carbitol? A. Your Honor, may I say a word?

The Court: Yes.

The Witness: I do not know just how much I should say about these formulas.

The Court: Go ahead.

Q. (Read.) A. That I don't know.

Q. Do you know what the solvent was? A. I am not sure.

Q. You think it was butyl carbitol?

The Court: He said he did not know. A. I am not sure.

Mr. Byerly: He is responsible, I think, for formulating these things.

The Witness: No, I am not responsible for those.

Mr. Free: Hilton Davis is not a party here. That is another company. And what difference does it (523) make what some other company made in the way of heat-set varnishes? I think that is entirely immaterial and irrelevant.

The Court: What do you want to prove by this witness?

Mr. Byerly: I would like to prove that his company is making varnishes for the purpose of making inks that infringe this patent, and is therefore very much interested in the result of this suit.

The Court: You have not made them a party, though?

Mr. Byerly: No.

The Court: Their infringing then is an issue entirely outside of this case.

Mr. Byerly: I think the fact is that one can always show an interest in the case on the part of a witness. If this witness is employed by a company that is interested in the case it seems to me that should be brought out.

Mr. Free: I still think that is immaterial.

The Court: You do not claim any infringement by Hilton Davis, do you?

Mr. Byerly: We have notified them they are infringing, yes.

Mr. Free: Then go on and sue them, but do not (524) inquire in this court about them.

The Court: What is it you wanted to ask him, what kind of a solvent they are using?

Mr. Byerly: Yes, in this ink listed in this catalog.

The Witness: I am not trying to evade that question. It is not that I would not tell you. That is made in the varnish department, and you know how large our plant is, and that is made in a cold cut varnish, and in 1941 before Pearl Harbor—things have changed a lot since then. We do not make those varnishes any more. Those are not in our new catalog.

The Court: Did you ever work in that department?

The Witness: I have done research work for them, correcting formulas and mistakes.

Q. So you have known what their formulas were? A. Not enough to keep them in my mind. I can go to the records at any time and find them.

Q. What did your have these drums of butyl carbitol for out at your plant that you drew the butyl carbitol off for the tests? A. Those were bought, I think the records show, quite a while ago. They are kept in stock. At present we are not using them. I think there were a considerable number of drums, and they have been standing there for six months or more.

(525) Q. Did you buy them before 1941? A. We have the invoice there as one of the exhibits, which gives the exact date.

Q. An invoice for the butyl carbitol? A. Yes.

Mr. Free: Is this it (indicating)?

Mr. Byerly: Yes, has it been put in as an exhibit?

Mr. Free: Not yet.

The Witness: Excuse me, I thought he had put it in evidence as an exhibit.

Q. That, if I read it correctly, shows the butyl carbitol was bought in 1942, doesn't it? A. Yes, in March 1942, about ten months ago.

Q. Were you still making this heat-set varnish, No. 321, when that was bought? A. That I could not say. Those orders go through the order department and are shipped out. If they were made within a day or two after the order is received, I really cannot say.

Q. Have you ever used butyl carbitol as a solvent in the heat-set varnish which you have been selling, for making ink? A. So far as I know we have used very little butyl carbitol in a heat-set ink.

Q. What have you used mostly? A. Mostly petroleum close cut solvents.

Q. In this varnish which you list, No. 321, which you say is a nitrocellulose type? A. No, not that one. (526)

You said which do we make the most of. We make the most of the petroleum close cut, in that we use butyl carbitol acetate.

Q. Then in these four heat-set varnishes that you list together here in your catalog, if I understand you right the first one has a solvent of butyl carbitol acetate and the other three have narrow petroleum cuts as solvents, is that correct?

Mr. Free: I still do not see the relevancy of this. What difference does it make?

The Court: It goes to his motive here in testifying, and affects his credibility and value as a witness, I think.

A. Yes, that is probably butyl carbitol acetate.

Q. Is that a complete answ r to the question? A. These are not heat-set inks. You know, they have to be compounded into an ink.

Q. I call your attention to the paragraph in the catalog immediately preceding the list of heat-set varnishes, and that states, does it not, "For the manufacture of magazine inks primarily blacks, which are to be run on high-speed rotary presses and immediately set by the application of heat, we recommend the following varnishes." That is in your catalog, isn't it? A. Yes, in our 1941 catalog.

(527) Q. Do you know George Nieder? A. Yes, he is our sales manager.

Q. I show you what purports to be a letter from him, will you tell me whether that is his signature?

The Court: Look at the signature and answer the question: is that his signature?

The Witness: I am not sure of the signature. It is our letterhead. I am not sure of Nieder's signature.

The Court: Then say so.

The Witness: I am not sure of the signature.

Q. Look at that letter and see if you have any doubt as to whether it came from your company? A. It is on the letterhead. I have never seen the letter. This is the first time I have ever seen it.

Mr. Free: It looks we are going away beyond the qualifications of this witness, talking about a letter written by somebody named Nieder, and certainly not relevant.

The Court: This is cross examination and I think it is proper.

Q. And in this letter it is stated, is it not, "Attached you will find copy of letter written to you on the above date. This situation still exists, and not until this matter is out of court will we be in position to discuss or furnish any heat-set vehicles." (528) That statement is in the letter, isn't it? A. That is correct.

Q. I show you what purports to be the attached copy. Is there anything about that to enable you to recognize whether that was an enclosure with that letter?

Mr. Free: I would like to note an additional objection. This is just plain hearsay, and I do not know what it adds to the case.

A. This all goes through the Sales Department. I have never heard of it or seen any of these letters. I cannot make any positive statements of any kind.

Q. You do know, don't you, that your company discontinued making these varnishes for the manufacture of quick-drying heat-set inks because they were charged with an infringement of the Gessler patent? A. I did not know that until I saw that letter. That would be purely in the Sales Department, not in the Research.

Q. I did not know whether your position in your company made you aware of those things or not. A. Well, if I wanted to spend extra time I could go into the files and

read those letters, but I have not, that is the truth. Those are all new to me.

Mr. Byerly: I would like to mark in evidence the catalog of the Hilton Davis Company.

Mr. Free: I object to it as immaterial and (529) irrelevant.

The Court: The objection is overruled.

(Marked Plaintiff's Exhibit 36.)

Q. Now, you gave a deposition in this case in Cincinnati, didn't you, Mr. Taylor? A. Yes.

Q. And you referred to some kerosene which you distilled in the presence of plaintiff's counsel in that deposition? A. Yes, sir.

Q. And you said then "We are going to take a gallon of kerosene out of the big storage tank that is loaded directly from the Standard Oil of Ohio delivery wagon." You said that? A. I did, I remember that.

Q. Now, did you testify here or did you not, that this kerosene came from some other oil company? A. Yes, we buy that in the market, depending on the price.

Q. Now, in your deposition you referred to the amount of this kerosene which you distilled off at 250, didn't you? A. Yes.

Q. You said that you were distilling it from a flask that held approximately 1500 c.c. of kerosene? A. Yes.

Q. I will show you this, if you have any doubt. I do not want to confuse you on it (handing paper). Now, on the next page you said there were 280 c.c. left after the distillation. A. That is right.

Q. And if those figures are correct, then the residue (530) which you got after this distillation amounted to about 18½ per cent of the amount you started with, didn't it? A. If you remember, we did not measure the kerosene we poured into the flask. We took about 1500 c.c., guessing from a beaker that held 2000 c.c. We thought it was approximately two-thirds full.

Q. Then there certainly was not more than 20 per cent of this kerosene left in the residue? A. Between 20 and 25.

Q. How do you get 25 out of it? A. Well, we will say 20 then, about 20.

Q. Does your company make up reports of research they have done in the form of this report I now hand you? A. That is their report.

Q. And these reports of yours are usually dated, I suppose, are they not? A. Well, if they are not it is probably a mistake.

Q. There seems to be a date here of June 11, 1934. A. That is correct.

(531) Do you remember your company did some consulting work for the plaintiff in this case at one time, some research consulting work for International Printing Ink Company? A. I knew that they did some kind of work, yes.

Q. And that was in connection with inks? A. That work was all carried on by Mr. Davis.

Q. You yourself personally had nothing whatever to do with this consulting work for International Printing Ink Company? A. Some of it I did, yes.

Q. Oh, you did do it? A. I was thinking of the matter of printing ink. I noticed some printing ink there.

Q. And you do not do any of this consulting work personally for I. P. I. on printing inks? A. I cannot recall whether I did or not.

Q. But you know the work was done by your company for I. P. I.? A. That is right; I do.

Q. Did you have any information as to the problems that you were asked to work out for I. P. I.? A. That I was asked?

Q. Well, that your company was asked to work out. A. No. Mr. Davis carried on all that work.

Q. You did not come in touch with it at all? A. I don't recollect any particular problems of printing inks.

Q. You remember that you were informed at one time your company was informed by International Printing Ink

(532) Company, "that a petroleum distillate so carefully fractionated as to distill within a narrow range, say 190 to 210 C. will make an ink which will give satisfactory quick setting by the application of heat." A. I do not know that.

Q. Now you have heard at some time that one refers to the weather, "This is a good drying day." What does that mean? A. Well, that means there is a breeze, not raining, not misty and not foggy, I suppose.

Q. You have noticed, haven't you, that clothes hanging out on a line dry faster on some days than others? A. That is correct.

Q. When you made this alcohol and water drying test you waved the paper you had them on in the air a little bit? A. That is correct.

Q. What was your purpose in doing that? A. Simply to speed up the test so that we would not be standing up here so long waiting for that.

Q. Yes, but how did that speed it up I want to know. A. Well, by carrying the vapors away from the paper.

Q. You mean if the air over the paper had been saturated or full of the vapors of the material that were evaporating then the evaporation would be slow? A. It would be slower.

(533) Q. That is— A. They were both on the same paper, done at the same time with the same waving.

Q. Yes. Was there any alcohol in the air in this room? A. Of course not.

Q. There was a considerable amount of water vapor, wasn't there? A. I don't know about that. You pointed to the windows at the time, and it is very cold outside, and any moisture in here would condense.

The Court: Is moisture pumped into this room as far as the air conditioning system is concerned—does anybody know?

The Clerk: I don't know, sir.

Q. If it is like any other air-conditioning system it would be, wouldn't it? A. It would.

The Court: Is it humidified?

The Witness: We can make that test in any other room and I think you will find comparable results.

The Court: I noticed in my chamber one window was very wet and the other absolutely dry. The dry one is where the heat comes up.

Mr. Byerly: Yes.

Q. Now what kind of paper did you put these two liquids on? A. I used this toweling, paper toweling I had.

The Court: Mr. Byerly, would you like to have (534) that experiment repeated under your conditions?

Mr. Byerly: I think we will repeat it. I just want to make a record of the conditions under which the witness did it.

The Court: Do you want to repeat it?

Mr. Free: I will offer right now to repeat it under any conditions that Mr. Byerly wants to do it.

The Court: I think that would be the best way if there is any doubt about it. If there is any claim that it wasn't fair you had better repeat it under your conditions.

Mr. Free: I want to settle that right now.

The Witness: I didn't mean it was not fair. I simply wanted you to know that water vaporized very slowly and alcohol with considerably more speed.

Mr. Free: The implication is apparently that that was unfair. Now I want to straighten that out.

The Witness: I did not mean "unfair".

Mr. Free: I suggest that Mr. Byerly name his own weapons so that we can do it the way he wants it done. We are perfectly willing.

Mr. Byerly: I should like to see it done with films—now you may have noticed the alcohol more spread out on that paper than the water——

Q. Didn't you? A. That is right.

(535) Q. So that it was in a thinner film? A. Well, the ideal way would be to put it in glass dishes and wait around—stand around here and see which evaporates first.

Mr. Free: How would it be if we ran a stream down a glass plate side by side?

Mr. Byerly: I think if you put a small drop—the trouble there again is you are faced with the difficulty that comes into this air conditioning system. We are bound to have a considerable amount of water in the room. I think it would be fair to pick some other substance—of which there is a considerable number—which has the same vapor pressure as water, and try that against alcohol. Otherwise to get a fair test you would have to desiccate the air of the room. I think your Honor understands what I mean. There is no alcohol in the air.

The Witness: Well, supposing we take toluol, which has a vapor pressure of water.

The Court: Take what?

The Witness: Toluol, which has a vapor pressure of water.

The Court: You designate what you want to test, and he will bring the stuff here in the morning and make it when court opens.

Mr. Free: I think I would like to insist on it, Mr. Byerly.

(536) Mr. Byerly: Well, I intended to do it myself, and I would be just as glad to have him do it. It is only a question of getting the stuff.

The Court: If there is any doubt about it I think we ought to do it.

Mr. Byerly: Yes.

Mr. Free: By all means, yes.

Mr. Byerly: I think that is quite right. Now the only material I happen to know of is this—what was it, the stuff that we had in the ink that we said had

a vapor pressure of a centimeter and a half? What was that?

Mr. Watson: Secondary butyl acetate.

Mr. Byerly: Secondary butyl acetate. Is that the same vapor pressure as water? I believe it is lower than water.

Mr. Free: Well, let us pick one like water, because water is the issue here.

Mr. Byerly: Yes. The toluol is near to that of water.

The Witness: I think you are right on that.

Mr. Byerly: Do you agree with that?

Mr. Free: Can you get some toluol overnight?

The Witness: I don't think I am able to get it myself in New York.

(537) The Court: Can you furnish that?

Mr. Watson: Oh, surely.

The Court: All right. Bring that in the morning.

Mr. Free: Mr. Byerly, let us see if we can get some overnight.

The Court: If there is any particular kind of paper you want it made on——

Mr. Byerly: I think a thin film on glass or some non-absorbent would probably give a truer picture. Of course your Honor understands that the test is to determine the question of whether Mr. Bragdon was right in saying it evaporated slightly faster, or Mr. Taylor is right in saying it evaporated a great deal faster? We do not for a moment deny that there will be some difference.

The Court: Well, let Mr. Bragdon make his own experiments to show that it evaporates slowly.

The Witness: The question to Mr. Bragdon, of course, was water and alcohol.

Mr. Free: Yes. I think Mr. Bragdon's obligation is to show that water and alcohol do or do not evaporate at the same rate, since that was the question that he gave the answer to.

As far as we are concerned we are willing to use some other substance, like toluol, in place of water, since (538) that has been criticized. Now, Mr. Bragdon's answer is on the record, and there it is.

Mr. Byerly: That is why I felt it part of my case to meet this proof here, but I am perfectly willing to have the witness make a test.

The Court: Do whatever you want about it. Get the substance, and in the morning we will make the test.

Mr. Byerly: Yes. I think that concludes the cross-examination, except for these inks, or the formulas for these inks that were purported to have been used. When they are produced I would like to ask the witness a few questions.

The Court: Can you get those here?

Mr. Free: Your Honor, I have asked someone to telephone to Chicago to get them on, and I don't know when they will come.

The Court: If they send them by air mail it will be here tomorrow.

(Discussion off the record.)

Mr. Free: We will get them here as quickly as we can.

Mr. Byerly: With that reservation, your Honor, I close my cross examination.

The Court: Now, do you want to examine him (539) tomorrow?

Mr. Free: I would like to ask him a few questions, but let us get this toluol and alcohol business straightened out.

The Court: All right, we will do that first.

Mr. Free: And you can go on with your cross examination tomorrow until you are through.

Mr. Byerly: I just said I was finished—oh, you mean on making this test?

Mr. Free: Yes.

Mr. Byerly: I have no objection to asking him questions. I think your Honor will probably ask him questions when he makes the test.

The Court: Yes, I will be interested. Now how many more witnesses do you have?

Mr. Free: About three more.

The Court: As long as this?

Mr. Free: No, I think not. They are short—and a couple of depositions. I thought I might take up one of the depositions tomorrow, because one of the witnesses has not arrived, and that will take up most of the day, I think.

The Court: You do not want to sit Saturday, do you?

Mr. Free: Well, I would rather not.

The Court: I will do whatever is convenient. (539a) We won't have Court on Saturday. We will adjourn until 10:30 tomorrow morning.

(Adjourned to Friday, January 22, 1943, at 10:30 a. m.)

---

(540) New York, January 22, 1943:

10:30 o'clock a. m.

TRIAL RESUMED.

CLINTON TAYLOR resumed the stand.

Mr. Free: If you will recall, your Honor, we left it last night that Mr. Taylor would remain on the stand to measure the difference between alcohol and water at room temperature as to evaporation rate. At any rate, the plaintiff wants him to do it and so he is ready for that now.

Mr. Byerly: Your Honor, Mr. Taylor suggested last night this toluol as a substance that was not in the air and had about the same vapor pressure as water. We have some toluol here. We also have some of the liquid used in the ink that Mr. Bragdon had, which was, I think, called secondary butyl acetate, which has a vapor pressure almost exactly the same as water. We find toluol is a little higher than water, about 2 as against 1½, so we will be glad to furnish samples of both of those.

Mr. Free: The question is between water and alcohol. There is nothing like water, and so if Mr. (541) Byerly wants to substitute something else for water that is up to him, but the issue is contained in Mr. Bragdon's answer to the question. He said here, I asked him this question: "Would you call water and alcohol similar or dissimilar insofar as vapor pressures are concerned? A. I would say they are in about the same class. They would evaporate at about the same rate when exposed in an open vessel."

The reason we asked Mr. Taylor to show that they did not evaporate at the same rate was to refute what Mr. Bragdon said here. The criticism was that we did it the wrong way. You tell us how you want to do it and we will do it, but we have looked into this, and we find there is nothing like water except water itself. This morning we tried it out on a glass plate in my office with some alcohol, and my office is steam-heated and is bone-dry, and the same condition happened, the alcohol went off a lot faster than the water. Maybe your Honor's comments yesterday might give us a suggestion. You mentioned the fact that one of your windows was drier in there than the other, and why don't we go in there and put the alcohol and the water on a glass plate and let it evaporate.

Mr. Byerly: I think, your Honor, it is impossible to get a perfectly dry, or anything resembling a dry (542) atmosphere here, and for that reason we suggested last night, and I understood Mr. Taylor to acquiesce, that we should use some liquid which was not in the atmosphere and had the

same vapor pressure. It may not be fair to inject this into the defendant's case. We are perfectly willing to make a test in rebuttal which we think will give your Honor a correct appreciation of the effect of the difference in vapor pressure. We are willing to supply Mr. Taylor with these liquids.

The Court: What was the point of this test originally?

Mr. Byerly: The point of this test originally was in Mr. Bragdon's prima facie testimony. He pointed out that an ink in a thin film would evaporate very rapidly if it, as he said, if its vapor pressure were in the order of centimeters, and he produced two inks and demonstrated to your Honor that they both evaporated rapidly when he set them out in a thin film; and one of those inks contained as a solvent ordinary alcohol which has a vapor pressure of about 4 centimeters at room temperature, and the other contained a liquid called secondary butyl acetate, which has a vapor pressure of about 1½ centimeters at room temperature, and he demonstrated those two. That was our demonstration. Then on cross examination Mr. Bragdon (543) was asked about the evaporation of water, which happens to have about the same vapor pressure as this substance in his ink he demonstrated, that is, about 1½ centimeters, and he said that alcohol would evaporate faster than water but not very much faster, and I think you pushed him a little on that on cross examination, Mr. Free, if I remember rightly.

Mr. Free: His answer that I have is that they did not evaporate any differently at all, that they evaporated at the same rate. He said "I would say they are in about the same class", page 78, "They would evaporate at about the same rate when exposed in an open vessel." The same rate. I proved with Mr. Taylor they did not evaporate at the same rate, and Mr. Byerly objected to that, and all I want him to do is to choose his own weapons and then demonstrate the difference between the rate of evaporation of

alcohol and water. I think if Mr. Byerly wants to prove that, let him prove it on his own case.

Mr. Byerly: I am willing to do that. I think you will find that you have not quite got that right.

Mr. Free: Maybe this is a suggestion. Would it be helpful to your Honor if we put it on a glass plate and took it into your room?

(544) The Court: Why is it necessary to take it into that room?

Mr. Free: I thought it might be drier there, because you mentioned the window being drier.

The Court: One window was drier and one window was just as wet.

Mr. Byerly: If we took it to Colorado I think we would have better success.

The Court: If we took a train for Colorado this afternoon we might demonstrate it and be back by Monday morning.

Mr. Free: I will bet my room is just as dry as Colorado.

Mr. Byerly: This question and answer were in Mr. Bragdon's testimony:

> "Q. Alcohol evaporates faster than water at room temperature, does it not? A. It does.
>
> "Q. And that is because of the difference between their vapor pressures at room temperature? A. That is true."

So that Mr. Bragdon made no contention that they evaporate at the same rate. That would be silly.

The Court: Unless he cares to use water, why, the testimony stands uncontradicted, but if he wants to make a test with something besides water, I think he would (545) be better off. It would allow the water to stand uncontradicted.

Mr. Free: I do not care what he does on rebuttal, because I wanted to point out that anything other than water is not water.

Mr. Byerly. In the first place you have not got the ink formulas yet that we asked for, have you?

Mr. Free. No.

Mr. Byerly: Then I have just a few more questions to ask Mr. Taylor.

Mr. Free: Go ahead.

Cross examination continued by Mr. Byerly:

Q. You put in two charts, Defendant's Exhibit Q and Defendant's Exhibit O, showing some of these substances, did you not (handing to witness)? A. Yes. There are oil of cloves and 502-C oil and butyl carbitol on both charts.

Q. What was the significance of putting in two charts with these materials? I did not quite follow that. A. Chart Q was the original chart I made when running the Lefferts and Stevens test. Chart O simply demonstrates the test that I had made previous to the test made when the plaintiff's counsel was there to witness them, were practically identical as far as the formulae and straight lines on a vapor pressure chart.

(546) Q. That is, you put these charts in to show that two sets of measurements were practically identical, is that the purpose? A. Chart O was put in, as it says, for four solvents as compared to the vapor pressure determinations witnessed by Mr. Byerly and Mr. Watson and checked by Mr. Blackmore.

Q. As I understand it, you put these in to show the two sets of observations gave the same result; not to show they gave a different result, is that right? A. Well, the two charts—I don't quite understand you. When the plaintiff's counsel visited our laboratory and I made tests on vapor pressure of the four solvents, I thought it would be interesting to make a chart, which I did, Chart O, comparing vapor pressure determinations taken in the laboratory not in the presence of the counsel and vapor pressures in the presence of the counsel and see if they compared favorably, and in making this chart you will notice that the points fell right on the same line, approximately.

Q. Then as I understand the significance of the charts, it is to show that the results were the same, substantially the same in those experiments, is that right? A. This large chart, Q, is a chart which was made to go with the charts of the curves that I submitted, another chart on the Lefferts and Stevens (547) test.

Q. Was chart O put in to show that chart Q was wrong or right? A. The chart O was not put in for chart Q. Chart O was simply put in as a check test, and it is made not in your presence, to check with the test made in your presence.

Q. And do they show that these tests gave substantially the same results? A. Yes, sir. You can see they fall line for line.

Q. Now looking at chart Q at 150 degrees that gives a vapor pressure of butyl carbitol of about 6 centimeters, doesn't it? A. Yes. The line falls at about 6 centimeters.

Q. And chart O gives the vapor pressure of butyl carbitol at 150 degrees at about 7 centimeters, doesn't it? A. Chart O gives the vapor pressure of butyl carbitol, about 6 centimeters.

Q. That is nearly 7 centimeters? A. Yes. The line can be varied by those dots. Your points are your determinations, and you have Brewer and Gardner, and any person in drawing a chart makes his determinations and then draws his line as close as possible to that determination.

I might answer that this way: In the Gessler patent the vapor pressure as given, I know, is 60 millimeters, that is, "about 60 millimeters." That was taken (548) from the Brewer and Gardner article which gives a vapor pressure of 66 millimeters if you read directly from the chart.

Q. Well, did you see any significance, then, between those two charts with regard to butyl carbitol? A. No, there is no real difference. You actually read the vapor pressure, the two vapor pressures being within experimental errors that I took in my readings, and that Brewer

and Gardner determined; you used the points on the charts given here in circles and then draw a line through those points as nearly as possible.

Q. I see. Then in your opinion the results shown on the two charts are practically the same? A. They are practically the same, yes.

Mr. Byerly: That closes the cross-examination, your Honor, except for a reservation when they get these samples of inks, in which case we might want to ask some questions.

Re-direct examination by Mr. Free:

Q. Mr. Taylor, in connection with the Doughty patent you will remember the question came up as to the similarity or dissimilarity between kerosene as you tested it to produce the Doughty fraction, high-boiling petroleum fraction, Exhibit Z, and the 1922 kerosene. Was there any difference between the two of them so far as (349) boiling ranges and distillation ranges were concerned? A. They were practically the same.

Q. Do you have anything to show that? A. I have a 1920 edition of "The Technical Examination of Crude Petroleum, Petroleum Products and Natural Gas" by Hamor and Padgett.

Q. Published by? A. McGraw-Hill. It is a Mellon Institute technical series. On page 352 we find there a distillation chart of certain petroleum products, and one of them is domestic kerosene. They give for the first point on the distillation chart at 5 c.c. by the A. S. T. M. method, 165 degrees Centigrade or 329 degrees Fahrenheit; the 95 c.c. point has 295 degrees Centigrade and 560 degrees Fahrenheit.

Q. And how about the boiling range? Is that given there, too? A. The distillation range?

Q. You just gave the distillation range, did you not? A. That is right, the distillation range.

Q. I will now ask you this question: Does that compare with the distillation range of the substance which you obtained for the Doughty patent? A. The kerosene I obtained on the Doughty patent had those identical points. I remember very well that the specifications from the Pure Oil Company for our kerosene was 360 degrees Fahrenheit for the 95 c.c. (550) reading on a distillation range.

Q. I notice on the curve that you have just referred to that it is called lamp oil, domestic. A. Just for the record I would like to read from page 26 of this book where it describes a certain substance:

> "The product is termed natural lamp oil distillate (burning oil distillate or kerosene distillate)."
>
> So what is called lamp oil in 1922 is kerosene.
>
> Mr. Free: I want to offer in evidence photostatic copies of pages 352 and the fly-leaf of this Mellon Institute book published in 1920 as Defendant's Exhibit J-1.
>
> (Marked Defendant's Exhibit J-1.)

Q. Now I think it might be helpful if you could show us in some way, Mr. Taylor, how these close cut petroleum fractions, like 502-C oil and the Doughty petroleum fraction, are obtained. A. I would like to do this with a simple deck of cards that I purchased the other morning. I think it shows very well what we mean when we talk about fractions of crude petroleum and close cut fractions of that petroleum. If we allow a deck of cards to represent petroleum as obtained from the ground and each card to represent a fraction of that petroleum the deck of cards divides (551) itself very nicely into four series. As we know, crude petroleum when distilled, we have the gasoline series which we might represent by the spades.

We have the kerosene series that we have talked about a great deal, which we can represent by the diamonds.

Then we have the fuel oils which we may represent by the clubs, and the heavier oils, the mineral oils by the hearts.

Now the mineral oils and the fuel oils and the gasolines we are not interested in with regard to this cut of kerosene. The cut we are interested in is the kerosene cut represented by the diamonds, and that, just as in a suit of diamonds, is made up of a series of—well, kerosene is made up in a series of hydrocarbons one following the other very closely, just as the cards do in a suit.

Now to make a close cut we may place this kerosene in a still and start to heat it and distill off each fraction. That fraction boiling below 250 would represent about two-thirds of the kerosene, represented here by two-thirds of the deck of the suit of diamonds. The upper portion boiling above 250 would represent only a few cards, or in the kerosene would represent what we have been calling a close cut fraction of kerosene. I think this demonstrates in (552) one way a method of representing the relation of close cut petroleum oils to the wide fraction of crude petroleum, wide range of crude petroleum. We simply take a cut out of one of the series of distillates of crude petroleum.

Q. In other words, you have a column of layers of materials which you call kerosene, and if you want the top fraction you just chop off the upper layer and use that and throw the rest away. Is that right? A. Yes.

Q. Now in reference to the Lefferts and Stevens patent, I would like to ask you whether the pyroxylin compounds referred to therein, such as at line 90 and line 91 of the second column of page 1, include this half-second nitrocellulose? A. It does.

Q. That you were asked about yesterday? A. It does.

Q. I think it might be interesting for us to take a look at some of that stuff and see what it looks like. Do you have some of it here? A. I have some in that envelope.

(Envelope handed to the witness.)

A. (Continuing) I have with me a sample of half-second nitrocellulose or pyroxylin, one of the forms of pyroxylin, which has all the appearance of cotton. It is nitrate of cotton. (Handing to Court.) You will notice that it is treated with mineral oil because it is quite inflammable and dangerous to carry around. (553) I put some mineral oil on it to cut down the inflammability, but the characteristics in appearance are identical to half-second nitrocellulose or pyroxylin.

Q. That is in the class of pyroxylin compounds which is referred to in the Eefferts patent? A. That is one of the pyroxylins.

The Court: Is that referred to as printing upon that?

The Witness: That is the raw material which goes into the solution, the material we speak of as nitrocellulose or half-second cotton or pyroxylin or lacquered cotton.

The Court: Well, he says something about printing upon that. Is that made into sheets?

The Witness: That is made into sheets.

The Court: Just like something by pressing?

The Witness: No. They dissolve that in a solvent and include a plasticizer and then run down into sheets.

Q. And the ink contains the same stuff, a solution of the pyroxylin and the solvent? A. Yes.

The Court: In the ink?

Mr. Free: Yes.

The Court: What happens when the two substances come together, one the ink and one the paper?

(554) Mr. Free: If the ink is printed on paper it sets on top; as the solvent evaporates when heat is applied it leaves the print. If you print with the same ink on pyroxylin for example, on the back of

some of these little celluloid cards that are passed out bearing a calendar, if you print on that, the solvent in the ink is also a solvent of the surface. Some will bite in and some will evaporate as the heat is applied. It works the same way on paper as it does on pyroxylin or celluloid.

The Court: What evidence is there here that it acts the same way on ordinary paper?

Mr. Free: Mr. Taylor demonstrated what he called those draw-downs with pyroxylin ink, and then he put it over the hot plate and the solvent went off.

Q. I wish you would take your copy of the Lefferts patent, Mr. Taylor, and refer to the first column on page 2, line 37, the sentence beginning with that line, and read it and tell me whether those light solvents are necessarily used or are optional? A. Some of the lighter solvents may also be used in confection with the above, such as fusel oil, wood spirits, grain alcohol, and so forth, not only active as solvents but also, it says, to prevent the ink from becoming too thick or adhesive.

(555) Mr. Byerly: Your Honor, I object to his commenting on this passage. It is perfectly plain what it means. I believe he was asked to state whether the inventor of this patent meant them to be used. I think that is a question for your Honor to say.

The Court: I think so.

Q. You were asked yesterday what the boiling point of terpineol is and I would like to have you check that in the dictionary. Do you have one handy? A. In Hack's Chemical Dictionary, Second Edition, page 923, under "terpineol", I find that he gives the boiling point of 219.8 degrees Centigrade.

Q. That is all. Now, there was some reference in your cross-examination yesterday to the Doughty patent being

directed particularly to metallic inks, and I want to ask you whether anywhere in the Doughty patent you find an exception or the contrary? A. That is whether you are allowed to use other pigments other than metallic pigments.

Q. Yes. A. On page 2 of the Doughty patent, column 1, line 1, he says, "The pigment preferable to bronze or other metallic powder." That is just simply his method of incorporating this bronze. Then with that statement about the pigment, on the same page, column 2, in line 67, he says, "The color will depend upon the (556) particular pigment employed, which may be other than metallic in character."

Q. Yesterday you were asked about your knowledge of some varnishes that were listed in the Hilton Davis catalog, and I would like to ask you about how many different products are used by the Hilton Davis Company? A. The Hilton Davis Company has, as far as I recollect, approximately 18 different departments, making a very diversified field, or covering a field of supplies for the printer and the printing ink market and for the paper maker. In those 18 departments we have thousands of formulas, and it is impossible for anyone to try to cover and remember those formulas.

Q. Those varnishes are just one or two products, is that right? A. We have three varnish departments. The lacquer varnishes, of course, are in the cold varnish department.

Mr. Free: Now, Mr. Byerly, I would like to see that Hilton Davis report you asked the witness about yesterday, if you please, sir.

Mr. Byerly: If your Honor pleases, your Honor will remember that I read the witness a few phrases from a report which he said was from Hilton Davis, and he said he did not remember anything about it, as I remember it, and could not identify it; and I question (557) whether that entitles counsel to see the

whole report. I would like to have your Honor's ruling on that. I have it here.

Mr. Free: You just showed him the cover with the Hilton Davis name on it, and you read from the report, and I think you ought to say what the report is about, because you asked him some questions about it.

The Court: What did the witness say?

Mr. Byerly: The witness answered that he did not know anything about the report. He said he knew it was the form of report that they put out.

The Court: If that is true your objection is good. I do not recall just what his answer was.

Mr. Free: You showed him the cover and asked him if he recognized the cover and he said he did.

The Court: Who is the report by, some third party?

Mr. Byerly: I will be glad to show it to your Honor.

Mr. Free: That is what I would like to know.

The Court: His testimony on that did not help either side, so I sustain the objection.

Q. In the course of your work with inks in these sixteen-odd years or more that you mentioned, did you have occasion to use new products as they came out on the (558) market from time to time? A. We do.

Q. And that includes resins? A. Resins, solvents, pigments, dyes. That naturally is the purpose of a laboratory along with a plant, to continually search out for new products to be used in varnishes and inks.

Mr. Free: That is all, your Honor.

Re-cross examination by Mr. Byerly:

Q. This book you put in to give us the distillation range on some American kerosene indicates that the kerosene

which the author of this book examined is different from the so-called typical American kerosene referred to in the book, which I showed you. You remember seeing this book that I showed you yesterday? A. Yes.

Q. Now, I am asking you isn't it evident from this book, compared with the book which you have produced, that the two American kerosenes referred to in these two books had somewhat different boiling ranges? A. The tests are entirely different and it would be hard to compare them. This is a standard American Society for Testing Materials method of testing kerosene. Had they used the same method, we could compare one with the other. This is a percentage method of distillation.

Q. From your knowledge of what this standard method means in the testing given in the book which your counsel produced, would it be possible that this kerosene (559) referred to in Defendant's Exhibit J-1 had a residue of 39.7 percent above 270 degrees C?

Mr. Free: I think that calls for a speculative answer. It does not say what kerosene is in that book.

The Court: The objection is overruled.

A. I would not know, unless I tried them. They are two different types of tests.

Q. Does the book which you produced refer to only one test on kerosene, or are there other kerosenes mentioned in it? A. I find there is only one test on the method that compares with my A. S. T. M. method, which we could use with any fair comparison of the kerosene I used. Other kerosenes are listed.

Q. Are there boiling ranges given? A. I do not see any other distillation ranges given here.

Q. But it does refer to other kerosenes? A. It does refer to other kerosenes. It gives the Government specifications on kerosenes they have tested.

Q. What was the end point of the kerosene, your present kerosene that you have got? A. The kerosene I used?

Q. Yes. A. I used the standard method.

Q. No, but I say what was the end point? A. The end point I did not determine.

Q. What was the nearest you came to the temparature of (560) the end point, your 95 per cent point? A. That was 560.

Mr. Free: That is Fahrenheit?

The Witness: Fahrenheit.

Q. Do you agree with the witness Krawetz, who was called by the defendant and whose deposition has been read here, who indicates that there is a considerable variation in the boiling range of kerosene? I will read you his answer to the question:

> "Q. What is the ordinary boiling range of the ordinary kerosene? A. Oh, the boiling range of kerosene might start in at 380, 375, although they used to run it through, and get it at times at almost 600; but the good kerosene will run from 385 to 520."

A. You see, 375 or 370 or 380 or 385 is only 5 degrees. That is such a slight difference in a hundred degrees that I doubt from day to day you would hold your specifications any closer than that.

Q. But he also refers to the fact that they used to have kerosene run as high as 600 Fahrenheit. That is quite different from 520. A. He says they used to. Does he use end point or 95 c.c.?

Q. He says they used to run it through and get at times almost 600. A. At times 600, probably.

Q. That is, you do agree with him that they used to get a higher range point in the old days than they (561) do now? A. Not according to this book.

Q. That book mentions several kerosenes and gives the range of one of them, is that right? A. That is right.

Q. Looking again at this book you produced, on page 350, there is a reference to a table referring to some kerosenes and so-called water-white kerosene. Under "Distillation" it says "Distilled below 600 degrees F.", doesn't it? A. It does.

Q. Can you ascertain from the data given as to the other two kerosenes on that page whether they would be less volatile? A. In speaking of the Doughty patent, all through this we have talked about ordinary kerosene, water-white kerosene. You have here long-time burning oil and heavy seal oil. They are not ordinary kerosene.

Q. The ordinary kerosene he says at 600 degrees. A. The top point of 600, the end point.

Q. I call your attention to the fact that at the top of the table on this page the word kerosene is used in the heading, indicating three of the oils referred to, is that correct? A. As a distilled group. We used ordinary kerosene.

Q. Do you find a reference in the Doughty patent to the words "ordinary kerosene"? Does he say "ordinary (562) kerosene"? A. I find on page 2 he says "fractions of kerosene boiling above 250".

Q. Just a moment, does he say "ordinary kerosene" or does he say "kerosene"? A. "Kerosene."

Q. Does he use the expression "close cut" and "narrow cut" or anything of that sort? A. Yes, on page 1 he does. He limits you to the oils you may use. Solvents burning materially above 300 degrees Centigrade are unsuitable. He gives you a limit.

Q. But when he is talking about kerosene does he use the expressions of "close cut" or "narrow cut"? A. No, he does not.

Q. In the Lefferts patent, which refers to pyroxylin compounds, you said, I think quite correctly, that half-second cotton is a pyroxylin. A. Yes.

Q. But you did not mean to take back what you said yesterday, to the effect that that particular pyroxylin com-

pound did not exist until about 1910, did you? A. I cannot be positive just when half-second cotton came into commercial use.

Q. You know it was after 1888? A. I could not say to that. Pyroxylin was invented around 1850 to 1860. That is 28 years later. Just what steps had been made to make various viscosities I am not an authority to state.

(563) Q. Do you know what kind of pyroxylin was used to make celluloid in 1888? A. To make celluloid would be about, I imagine, a viscosity of anywhere from 10 to 20, or the like, four second cotton.

Q. That is quite different from your half-second cotton you used, isn't it? A. Cottons are alike in their solubility and all their properties, except the viscosity when made into a solution.

Q. Do they make a much thicker solution? A. A much thicker solution as a second, but the other properties are identical.

Q. You know as a fact that these low viscosity cottons are a fairly recent development, don't you? A. Oh, no, they are not a recent development, that is, you would not imply in the last ten years.

Q. I mean to say in the present century. A. I stated, I think, I am not able to tell when they were first put out.

Q. In Exhibit B-1 you have given a boiling range for terpineol from 210 degrees to about 217 degrees, haven't you? A. The terpineol I used to take my vapor pressures of, I have two readings on this chart, of the terpineol, and at the starting point of 5 c.c. it is approximately 210, and the 95 c.c. reading is 218.

Q. And the boiling point you got from the book was what? Was somewhere near the upper end, wasn't it? (564) A. 219.

Q. Part of the terpineol will fall off considerably below that, or at least as low as 212, according to your chart; isn't that right? A. That is correct.

Clinton Taylor, for Defendant—Re-direct.

Q. This bottle that your counsel has produced is the oil of cloves that you used to measure vapor pressure? A. Yes.

Q. That is, you mentioned the vapor pressure of this particular oil of cloves? A. Yes.

Q. The bottle contains the statement, "twice rectified", does it not? A. Yes.

The Court: What does that mean?

The Witness: It is pure U.S.P. oil of cloves.

The Court: What does "rectify" mean?

The Witness: That is a manner of cleaning it up and purifying the oil of cloves.

Mr. Byerly: That is all.

(565) *Re-direct examination by Mr. Free:*

Q. You will notice, Mr. Taylor, in referring to the Doughty patent, that you mentioned the upper limit of the solvent as preferred by Doughty, as being 300 degrees. That is in line 76 of page 1. When you cut off kerosene to make a petroleum fraction above 250°, as instructed in line 19 of page 2, how close a cut do you get? A. You will get a cut of about 40 or 45 degrees Centigrade.

Q. At least not more than 50? A. Not more than 50.

Q. Now I would like to make it clear that the temperatures given for boiling ranges are either the same or different from the temperatures given in the distillation ranges. Can you explain that? A. Well, if I understand you correctly, the standard method used by all petroleum companies is the A.S.T.M. method of distillation range. So long as all petroleum chemists use that method they are agreed that they will get the same results of different kerosenes in different parts of the country. The results will be comparable. When you try to compare a chart with an end point against a chart giving a distillation range, the two are not comparable.

Q. Where is the thermometer when you measure the distillation range and where is it when you measure the boiling

range? A. The thermometer, when you measure the distillation range by the A.S.T.M. method, is up in the (566) neck of the Engler flask, where the hot liquids go, pass over the bulb of the thermometer.

Q. And in the other method? A. The boiling range. I have never taken that. The A.S.T.M. is an accepted method.

Q. Now looking at the Doughty patent again, in line 18 of the first column on page 2, where he mentions fractions of kerosene, to you as one working in this art, would that mean ordinary kerosene or special kerosene? A. Well, that would mean ordinary kerosene, and I think you are limited by what he says on the previous page when he gives you a definite limit that the solvent should not boil above 300 degrees Centigrade to get a usable ink.

Mr. Free: That is all.

Re-cross examination by Mr. Byerly:

Q. Just one minor point on this Doughty patent. This expression you have referred to, in the second column on page 1 states:

> "Preferably the boiling point of the selected medium should be between 200 and 300 C., a boiling point lower than 250 C. being desirable."

So when he begins to talk on page 2 about kerosene, his remarks are directly the opposite, are they not? That is, in this case he wants something boiling over 250. Can you reconcile those? A. Only by experimentation; (567) in one case he is speaking specifically of kerosene, and that is all that I can see.

Mr. Byerly: That is all.

Mr. Free: That is all, Mr. Taylor.

Colloquy of Counsel.

Mr. Free: Now, your Honor, in view of the comment by counsel about the Hilton-Davis matter, that is, that there is nothing in the record which would help you to decide, I think it ought to be stricken, and I make a motion to that effect.

The Court: Is there any objection?

Mr. Byerly: I have no objection to striking—there were several matters. You mean the Hilton-Davis report?

Mr. Free: Yes. I think you ought to strike all of it.

Mr. Byerly: No.

The Court: Let us take up the report first. Do you consent to that?

Mr. Byerly: Merely because his Honor said the evidence may not be important, I do not know that that makes it incompetent.

Now what do you want to strike?

Mr. Free: Page 530, starting with the question about halfway down, to the first answer on page 532.

(568) The Court: Where is that?

Mr. Free: About the middle of page 530, and from there through the first answer at the top of page 532. That is all about the report.

The Court: Well, it was brought out there that his company did consulting work for the plaintiff in this case. That might be important.

Mr. Free: It does not lead anywhere. We seem to be agreed on that. I do not think it ought to be in the case.

The Court: Why should this go out?

Mr. Free: It is entirely immaterial and does not belong in the record, and is irrelevant because the net result of it all is that he did not know anything about the report.

The Court: What do you say to that?

Mr. Byerly: If your Honor please, there is a question beginning at the end of page 531:

Deposition of William A. Magie, for Defendant—Direct.

"Q. You remember that you were informed" and so forth, and the answer is: "I do not know that."

It is not clear to me whether that question goes in or out; but I do not think it is incompetent. He said he did not know.

Mr. Free: Well, if there is any pertinence at all to this report, we have a right to see it. If we can-
(569) not see it we do not know what is in it, and certainly there should not be anything in the record about it.

The Court: There is no interpretation on it, so I will deny the motion.

Mr. Free: Now, your Honor, I would like to offer in evidence the Magie and Krawetz depositions.

Deposition read in evidence of William A. Magie produced as a witness for defendant, who, being first duly sworn, deposed and said:

Direct examination by Mr. Free:

Q1. Please state your name. A. William A. Magie.

Q2. You are connected with the Magie Brothers Petroleum Products Company at 1640 Carroll Avenue? A. That is right.

The Court: Whereabouts is that?

Mr. Free: That is in Chicago. (Continuing.)

Q3. What is the business of that company? A. We are in the petroleum lubricating oil and solvent business; everything except gasoline and fuel oil, I guess that is the way you would describe it.

Q4. And you have among your customers of the Chicago office the Sinclair & Carroll Company? (570) A. That is right.

Q5. I show you four invoices, dated January 2, 1941, January 29, 1941, January 30, 1941, and February 15, 1941, from Magie Brothers Petroleum Products to Sinclair & Carroll Company, Inc., and ask you whether you recognize them (handing documents to the witness)? A. I recognize them, yes.

Q6. These are invoices regularly issued by your company to your customers for purchases of products from you? A. Yes. These are the duplicates there; but apparently the original goes down to New York, I guess; that is right.

Q7. The 502-C oil mentioned on one of these invoices is one of your products? A. That is right.

Mr. Free: I offer in evidence as Defendant's Exhibits K-1, K-2, K-3 and K-4, the invoices identified by the witness, and I offer them in order of chronology.

(Marked Defendant's Exhibits K-1, K-2, K-3 and K-4 respectively.)

By Mr. Free:

Q8. In connection with such products as this 502-C oil, did you ever have occasion to ascertain the physical constants, such as vapor pressure, boiling range, and so forth? A. Well, that is an unusual request. I will say this, we do get distillation ranges primarily, and we (571) have in the past worked up vapor pressure points; we have done that.

Q9. How do you go about getting that information? A. Well, that is an information we cannot do with our own oil. I mean, that is work we do not do on our own oil. That has been turned over to Mr. Krawetz here, who worked that out.

Q10. Mr. Krawetz is with the Phoenix Chemical Laboratory of 3953 Shakespeare Avenue, Chicago? A. That is correct.

Q11. I show you a report marked, "Laboratory No. 144,560", dated July 1, 1941; to Magie Bros. Oil Co.; by

Phoenix Chemical Laboratory, Inc., and ask you if you recognize that (handing document to the witness)? A. I do.

Q12. Was that received by you on or about the date that it bears? A. I believe that is correct.

Q13. And it has been in your possession ever since until you handed it to me a few minutes ago? A. That is right.

Mr. Free: I offer in evidence as Defendant's Exhibit LL, the laboratory report produced by the witness.

The Court: This exhibit here does not say what it was that he examined—the vapor pressure based on the distillation range of what?

(572) Mr. Free: That will come out later, your Honor. The sample 2 is identified as 502-C oil.

The Court: Well, there is nothing on here.

Mr. Free: The witness brings that out later.

(Marked Defendant's Exhibit LL.)

By Mr. Free:

Q14. Referring to this report, what do the two samples marked No. 1 and No. 2 refer to? A. The No. 1 sample refers to our 470 oil, and the No. 2 to our 502-C oil.

Q15. And you identified the samples of those two oils in the way they are shown on this report? A. Yes.

Q16. When you sent them to Mr. Krawetz? A. That is right; and I identify them here by their boiling range, too.

Q17. Do you recall a telephone call from Mr. Roy Carroll, of Sinclair & Carroll, within the last ten days, asking you for the vapor pressure and boiling ranges of the 502-C oil? A. I do.

Q18. And you gave him the data that he requested by telephone in reply? A. That is right.

Q19. Where did you obtain that data? A. Well, I obtained that data by going back through the file to this report here.

Q20. You are now referring to this report of July 1, (573) 1941, Defendant's Exhibit LL? A. That is right.

Cross examination by Mr. Byerly:

Q21. I will ask you a couple of questions until we get the book. Mr. Magie, how long has your firm been selling this oil which you call 502-C? A. Since about the middle of 1938.

Q22. In February, 1939, did you put out a circular giving the boiling range of this oil, 502-C? A. In February, 1939, I think we may have done that, yes, sir.

Q23. Is the boiling range given under Sample H of Exhibit LL the same as that which you put out in your circular of this oil? A. Well, now, you have got me there. I assume that it is; but I just cannot say that offhand. Yes, I would say it should be.

Q24. The boiling range would not be different in 1939 from that in 1941? A. There should not be much difference there, no.

Q25. How do you control the boiling range of these (574) fractions? A. Well, they are controlled in a tower; I mean, when we cut these fractions, they are cut in a regular fractionating tower, and they are balanced, and when we get the material coming that we want, that particular fraction that we want coming off, we have to test that for distillation before we can consider that as the product, and then it has to be tested every fifteen minutes in order to control that particular stream.

Does that answer your question?

Q26. Yes. These vapor pressure figures are something that you do not determine in your laboratory? A. No, sir, we do not.

Q27. And when you sent this to the Phoenix Chemical Laboratory, Inc., did you tell them your boiling point range figures for this sample? A. We told them our boiling range, and I think that they have had samples for distilla-

tion; but I think in this case the boiling range was given to them and calculated from that.

Q28. Is this Sample II a solvent? 502-C, would you call a narrow cut? A. Yes; yes.

Q29. How long have you been in the business of selling oils for use as solvents? A. Since the middle to the end of 1938.

Q30. Did you sell any oil before 1938? A. A solvent?

Q31. Yes. A. No solvent. We have been in business for fifty-three years.

Q32. I see. A. Fifty-four years.

Q33. Did you make this narrow cut before 1938? A. No, sir.

Q34. Did you find there was a demand for narrow cut oils as solvents in 1938? A. No; no, we did not.

Q35. Why did you start to sell them then if there was no demand? A. You mean— We started to sell them in 1938, the middle or the end of 1938, because we had requests for oils of that type.

Q36. And, if I understand you correctly, this was the first time you had requests for oils of that kind? A. That is correct.

Q37. Did these requests indicate the purpose for which these oils were to be used? A. Yes; yes, they did. They were to be used in this quick-dry type of printing.

Q38. You have sold narrow cut solvents to the International Printing Ink Company, or Interchemical Company, have you not? A. Yes.

Mr. Byerly: That is all.

Re-direct examination by Mr. Free:

Q39. Is there any substantial difference between the 502-C oil which you sold to Messrs. Sinclair & Carroll in February, 1941, and that which you sent to the Phoenix (575) Laboratory for testing? A. You mean—will you read that? A. No.

Q40. You try to cut the 502-C oil as accurately as you can in your various runs in the still? A. Oh, yes.

Q41. And that conforms to a specification which is relatively rigid? A. Yes, it is.

Q42. You were asked by Mr. Byerly whether you sold solvent oils to the I.P.I. Do you know whether you sold them to the I.P.I. before you sold them to Sinclair & Carroll, or after? A. You have got me there. I don't know. I can get that record.

Q43. It is not important. I thought you might remember. A. Wait a minute. I think that in the (576) Spring of—or the Winter of that year, that we had a request for oil from I.P.I. I don't want to put this in without knowing it definitely; but that was my recollection.

Q44. That was the Winter of 1941? A. No. We are going back to 1938 now. That other is the Winter of 1941.

Q45. Now you said two years; I did not know which year you meant. A. I meant back in 1938.

Q46. You have long been selling kerosene and torch oil and illuminating oils, have you not? A. We have been selling kerosene as an accommodation, you might say, for a good many years; yes, we have been.

Q47. And this 502-C oil is a cut from the kerosene series, is it not? A. It is between kerosene and fuel oil distillate. I had better say that.

Mr. Free: Now the deposition of Mr. Krawetz.

Deposition read in evidence of John Krawetz produced as a witness for defendant, who, being first duly sworn, deposed and said:

Direct examination by Mr. Free:

Q1. Please state your name. A. John Krawetz.

Q2. You are connected with the Phoenix Chemical Laboratory, Inc., of 3953 Shakespeare Avenue, in Chicago, are you not? A. Yes, sir.

Q3. What is your capacity? A. I am the President of the Company.

Q4. Will you give me a brief outline of your education and training along the lines of chemicals and fuels? A. I was graduated with a Bachelor of Science Degree from Northwestern University in 1923, and was awarded my Master of Science Degree in 1934, at which time I decided to devote myself exclusively to the study of petroleum and petroleum products, and in that manner I started to work as an engineer and investigator, and finally developed my own laboratory, and have been operating the Phoenix Chemical Laboratory ever since, and we are devoted exclusively to the study of petroleum products.

Q5. I show you Defendant's Exhibit LL, and ask you (577) whether you recognize it (handing document to the witness)? A. I do.

Q6. Whose signature is that at the bottom of that document? A. This is my signature.

Q7. As for the data on that report, do you recognize that? A. I do.

Q8. Tell us what you understand to be the meaning of the two notations, "Sample I" and "Sample II" on Exhibit LL. A. Sample I and Sample II were subjected in the first instance to a so-called A.S.T.M. distillation.

Having obtained an A.S.T.M. distillation curve, we took the 50 per cent boiling point as the basis of calculating the vapor pressure of the material at various temperatures.

Q9. Now will you describe briefly what you mean by A.S.T.M. tests that you mentioned? A. The American Society for Testing of Materials has established procedures for examining various types of products, amongst them petroleum products.

Inasmuch as petroleum products are, in the main, mixtures of hydrocarbons rather than single chemical identities, it is necessary to very definitely establish the test procedure because unless you definitely establish the test procedure

insofar as, let us say, the distillation is concerned, you may obtain all kinds of results.

In other words, if you distill a mixture of materials by various methods, you will get various distillation ranges, which is not true in the case where you are dealing with a chemical identity, just one chemical compound.

Therefore, the American Society for Testing Materials has definitely prescribed the flask in which a distillation is carried out. That is, the dimensions of the flask; the position of the side arm on the neck; the diameter of the neck of the flask. They have definitely described the position of the thermometer. They prescribed the rate at which heat is applied to induce distillation. They prescribed the cooling bath.

So everything that is variable, that is, in test procedure, is established because, we have no control over the mixture of the material; that is, we can control the distillation range of the material, but we cannot control the concentration of the individual molecules of hydrocarbon present in the mixture.

So we have to definitely control the test procedure, so that laboratories in different parts of the country and different parts of the world can obtain similar reproducible results.

Q10. With that A.S.T.M. method you obtained the boiling points of both Samples I and II shown on Defendant's Exhibit LL? A. That is right.

Q11. Now, having obtained those, I understood you to say a while ago you likewise obtained the vapor pressure— A. That is right.

Q12. —as indicated on Defendant's Exhibit LL? (578) A. That is right.

Q13. Now, how did you go about doing that? A. To determine the vapor pressure, there are two ways of doing it. One is to determine experimentally each vapor pressure at their temperature. But that is long-winded and is not usable for control purposes.

So there have been developed charts by the petroleum industry. Those charts have proven to be very satisfactory and do not deviate to any degree from the experimental data.

The chart which I have there (indicating) is one published in "Petroleum Refinery Engineering" by Nelson, "First Edition," "1936," "McGraw-Hill Book Company, Inc." on page 127.

The data obtained has proven to be accurate and is easily obtained. You have a curve, showing the boiling point of the material at 760.

Q14. Please identify the curves; the lefthand curve, the middle curve— A. The middle curve.

Q15. —and the right curve. A. That is the middle curve. Now, is this the right (indicating)?

Q16. Yes. A. The righthand curve shows the temperature range at which the vapor pressure might be desired. Then laying a straight-edge across the two curves, one point on the temperature at which the vapor pressure is desired, and the other point on the boiling point of the material, the vapor pressure will then be shown at the intersection of the straight-edge, and the curve on the lefthand side (579) of the book, showing vapor pressure in millimeters mercury absolute.

Q17. Now, that is the way you obtained the vapor pressures, in millimeters— A. Yes, sir.

Q18. —given on Defendant's Exhibit LL? A. That is right.

Mr. Free: I offer in evidence as Defendant's Exhibit M-1, the flyleaf, pages 124, 125, 126, 127 and 128 of Nelson's book entitled "Petroleum Refinery Engineering, First Edition", published in 1936, McGraw-Hill Publishing Company, New York.

(Marked Defendant's Exhibit M-1.)

Q19. Approximately how many times have you had occasion to use this method of ascertaining vapor pressures of petroleum liquids from the boiling points thereof? A. Well, it is quite frequently. I don't know just how many times; but on the average, requests for information of this type come in to us about ten times a month.

Q20. And you have done that for some years? A. Yes.

(580) Q21. About how many? A. Oh——

Q22. One, two, ten? A. Oh, I have done this—of course, this data was later than 1936. It has been proven correct in 1928. I have been doing that for about ten or twelve years.

Q23. These samples that were received by you from Magie, on which reports, Defendant's Exhibit LL, were made, were marked "Sample I" and "Sample II", as they came to you? A. Yes, that is right.

Q24. And you reported them accordingly? A. As "I" and "II".

Cross examination by Mr. Byerly:

Q25. Mr. Magie said that he gave you his boiling range data on these samples when he gave you the samples. A. I don't think so. I think we determined the boiling point range data ourselves because if—there are different instances where Mr. Magie called us up and told us the boiling point range; then we never rendered any report because we did not send him any bill.

Now, in this case there is a complete report; there was a bill and our records indicate that the distillation was run, so I think that Mr. Magie was thinking of other instances where he just called us up.

Q26. You would not send him a bill for just deter-
(581) mining the vapor pressure from the chart, when you were furnished with the boiling range? A. No, not to a regular customer.

Q27. How much did you charge him for this report? A. I really don't know. I would think the complete reports amount to something like ten or twelve dollars for the two. I would not remember exactly.

Q28. Did you specialize in chemistry in college? A. Yes.

Q29. Since you have been out of college, you have worked only with petroleum? A. Only with petroleum. But I have a layman's knowledge of other products. But I have devoted myself exclusively to petroleum.

Q30. Now, looking at the last line of your report, which was where you drew the line on the chart to get the figure 18 millimeters— A. Let's see. I have not a good straight-edge here. This is about 150 Fahrenheit. We will put it down, 302.

Now, 522 F. is the average boiling point; so it shows a vapor pressure of 18 mm.

Q31. Now, this simple method uses only the 50 per cent boiling point, don't it? A. It takes the average boiling point, otherwise we would have to take each fraction by itself. If you want to get it, you will take a true boiling point curve and then take each fraction (582) by itself, and then of course it gets to be so complicated, and any additional information is merely figures. It has no real value.

Q32. Is it your understanding that all petroleum fractions which have the same 50 per cent boiling point are identical? A. Now, no, because "identical" deals with a lot of other things. There are many things that may have the same boiling point and there are many things that may have the same vapor pressure, and yet they are absolutely different materials. They stand in no relationship to each other; just as you may have a colored man and a white man and a Chinese, each of them five feet six inches tall.

Q33. But getting down a little more to the boiling range; here you have given the boiling point on five, the boiling point for this material. A. That is right.

Q34. Now, can you conceive of a fraction of petroleum in which the 50 per cent boiling point would be identical

with that which you have here, but the other four boiling points were different? A. That is quite possible. But then your fifth would be—it would be a case in which 50 per cent boiling point does not represent the average. But that 50 per cent boiling point gives you practically the average.

Q35. But if that was not so, how would you use the table? A. If it were a case where you had something (583) that starts boiling at 80, in other words, the boiling point would run up to 700, I would not use that table at all; the table would not fit into a picture like that. The table only fits into a picture where your boiling points will be approximately your true boiling point; but it is true for a continuous distillation.

Q36. Now, only in the case when that 50 per cent boiling point represents the average point? A. Yes, readily approximates the average, then you see it is to be used. Otherwise, you can use the average boiling point, if you want to, because after all Raoult's Law of vapor pressure of your material represents the qualitative and quantitative quantities of the constituents.

So the average boiling point would give you a vapor pressure.

Q37. Looking at your first curve in the book, that is, the lefthand one, on page 127, is that a logarithmic scale? A. That is a logarithmic scale.

Q38. But it has no zero on it, has it? A. No. It approaches zero; that is the closest it comes.

Q39. Then this zero figure given in your report for 114 degrees C. is not accurate, is it? A. No; it is marked "approximately".

Q40. Are any of these figures closer than one milli-(584) meter in accuracy? A. Well, I would not say that they are. You see, being mixtures of this kind, it is hard to say whether it is within one millimeter, or whether it is within two millimeters. It is close as necessary for the operation of a refinery.

Re-direct examination by Mr. Free:

Q41. Suppose you wanted to find out what the vapor pressure of this 502-C oil is approximately, at a low temperature range. A. Yes.

Q42. How would you go about doing that? A. Well, what we would do probably, try to—of course, if it gets down to a low temperature, the ordinary instruments may not be there to—there would not be any indication; there would be a trace of vapor pressure; there is bound to be a trace of vapor pressure, such as even a piece of iron has a vapor pressure.

But I would say that, in my opinion, in the laboratory I would not have any instrument that would be sufficiently accurate to permit me to determine the vapor pressure at a low temperature.

Q43. So you would estimate it by extrapolation or some other method? A. I certainly would.

(584-A) Q44. These hydrocarbons, such as 502-C oil, are in what hydrocarbon series, approximately? A. Well, this material would be a very narrow cut; it might be the very end of the kerosene range, and it might be just a little from the low end of the distillate.

But, in general, this is specially prepared material, because your kerosene and distillate overlap, and you would find that your distillate—within your distillate oil, your fuel-oil, would have a lower initial boiling point than this. This is a specially provided fraction.

Q45. That would be in the pentadecane up to the octadecane series? A. Yes, because there are so many branches which increase the boiling points, and so forth. So, at the end, the tail-end of kerosene, you might term it.

By Mr. Free: That is all.

Re-cross examination by Mr. Byerly:

Q46. You say this is a narrow cut. What is this boiling range of 502-C? A. The boiling range is from 505 to 549 Fahrenheit. It is a 50-degree cut.

Q47. It is really less than 50 degrees; about 4—. A. 44.

Q48. 44 degrees Fahrenheit? A. Yes, 44 degrees Fahrenheit. But that is a mighty close cut. You can call it 44 if you want to; but in refining operations, two or three degrees either way means very little, because you are dealing with mixtures and you have big equipment. Your equipment is accurate but not precisioning equipment.

Q49. What is the ordinary boiling range of the ordinary kerosene? A. Oh, the boiling point of kerosene might start in at 380, 375, although they used to run it through, get it at times at almost 600; but the good kerosene will run from 385 to 520.

By Mr. Free: Fahrenheit?

By the Witness: Fahrenheit.

By Mr. Byerly:

Q50. That is, the boiling range, 140 degrees Fahrenheit, is that right? A. Yes; that is right.

Q51. How about fuel oil, what is the boiling range of that? A. Well, that depends whether that is a No. 1, 2 or 3 distillate, and if you term that the fuel oil, you may say it is around 380 and runs up to the very heavy stuff that will crack before it will distil.

Q52. What is vapor pressure? A. Vapor pressure of a material is the pressure developed by the substance against the atmosphere. You see you have several materials, like hydrocarbon mixture, millions of little molecules. Some of them have energy driving them out; others are coming in. Now, the force generated by those trying to get out against those that are falling back, and the resistance they exert against the atmosphere is your vapor pressure.

Q53. If the liquid is actually boiling, what is it? A. 760, under ordinary atmosphere. Now, like today, if your barometer is 750, then the boiling liquid is 750. Then again, if you put pressure on it, then that is different. But under ordinary atmosphere, generally speaking, it is 760.

By Mr. Byerly: That is all.

By Mr. Free: That is all.

Now I would like permission so that this Exhibit LL is a little clearer, to mark the Sample II in the border with the legend "502-C oil".

Any objection to that, Mr. Byerly?

Mr. Byerly: No, I am agreeable to that. (Mr. Free marks the exhibit.)

(585) Mr. Free: Now, your Honor, we have another deposition, that green binder, and that is on prior use, testimony taken out in Cleveland.

The Court: This is on prior use?

Mr. Free: Yes, your Honor.

The Court: Do you want to read all of this?

Mr. Free: Most of it, yes. It will probably take the rest of the day. Now the testimony of Edward Beres:

Deposition read in evidence of EDWARD BERES produced as a witness for defendant, who, being first duly sworn, deposed and said:

Direct examination by Mr. Free:

Q1. Will you please state your name, age and residence? A. My name is Edward Beres; my age is 33 years; my residence is 13010 Soika Avenue, Cleveland, Ohio.

Q2. Mr. Beres, where are you now employed? A. The Cleveland Tractor Company.

Q3. And what are your duties there? A. Gisholt operator. That is a machine like a lathe for making certain parts for tractors.

Q4. Prior to your present employment, Mr. Beres, by whom were you employed? A. The Tower Press.

Q5. And when did you leave the Tower Press? A. The 23rd of last month.

Q6. What was your employment prior to the time that you were with the Tower Press? A. Evangelical.

Q7. By "Evangelical" do you mean Evangelical (586) Press? A. Evangelical Press.

Q8. Company? A. Publishing House.

Q9. Was there any connection in any way between Evangelical and Tower? A. The same man managed the Evangelical Publishing House who is now President of Tower Press.

Q10. Is it not a fact that the Tower Press is, in a sense, successor to Evangelical Press? A. Yes.

Q11. Tower Press is now located in the same place where Evangelical was located? A. Yes.

Q12. Where is that? A. 1900 Superior Avenue.

Q13. Do you remember when you first came to Evangelical Press? A. It was May 19, 1925.

Q14. Do you know a Mr. Joseph F. Jirousek? A. Yes.

Q15. Who was he? A. He was my foreman.

Q16. He was your foreman? A. Yes.

Q17. Where, if you please? A. Tower Press.

Q18. At the Tower Press? A. Yes.

Q19. Was he at any time with Evangelical Press? A. Wait a minute. At that time they hadn't changed management yet. It was Evangelical Press then. Evangelical still owned it when he was there.

Q20. Well, as I understand your answer then— A. He was with Evangelical.

(587) Q21. —he was with the Evangelical Press at that time? A. Yes.

Q22. What was his job there? A. Foreman; supervisor of the press room.

Q23. What was your job at Evangelical then? A. Press room. Kelly operator.

Q24. What do you mean by "Kelly operator"? A. I was working on a Kelly press.

Q25. Is that the name of a kind of press? A. Yes.

Q26. What kind of press was it? A. It is a flat bed cylinder press; small press.

Q27. Is it the kind of press where the paper goes around a cylinder or through the press flat? A. It goes around the cylinder.

Q28. Have you any idea when Mr. Jirousek came with Evangelical Press? A. I think it was about 1929 or 1930; somewhere around there.

Q29. Is there any way in which you can arrive at that date from some experience of your own? A. I got married while he was there, September 3, 1931.

Q30. You got married while he was foreman? A. Yes.

Q31. What sort of printing did you do at Evangelical, Mr. Beres? A. All sorts of weeklies and monthlies, letterheads, envelopes, all kinds.

Q32. By "weeklies" and "monthlies" I take it that you (588) mean publications? A. Yes.

Q33. Did Mr. Jirousek at any time bring you a special ink and ask you to use it?

Mr. Watson: I object to that as leading.

The Court: The objection is overruled.

A. Yes, sir.

Q34. Can you relate the circumstances connected with that? A. Well, I remember the first day that he started to work on it when I had to go out and get some chemicals for him that he used in mixing the ink.

Q35. By working on it what do you mean? A. Well, that is when he was preparing the ink and later on I used

the ink. I had to use the ink on a weekly that had to be out as soon as possible. In other words, the job came in late and it had to be printed and folded, and put out quickly.

Q36. You spoke of Mr. Jirousek sending you somewhere for chemicals. Can you tell us more about that? A. Do you mean where he sent me?

Q37. Yes. A. Sherwin Williams Company, down in the flats.

Q38. Do you remember any of the circumstances of his sending you? A. I will never forget the time when he brought me an envelope and said to me, "You are fired." He said, "There is your pay."

(589). Then he said, "Now, I am just kidding you. Go down to the Sherwin Williams Company and get this stuff for me." I remember that distinctly.

Q39. Do you remember what he sent you for? A. No; I don't. It was in the envelope and I never looked.

Q40. By the statement that it was in the envelope do you mean that what he sent you for was in the envelope or that the instructions were in the envelope? A. The instructions, what I was supposed to get.

Q41. What did you get, if you know, or if you remember? A. It was something in a can, I believe.

Q42. Do you remember anything about what it was like? A. No; it was wrapped up.

Q43. Do you remember any characteristic of it that impressed you at the time? A. Yes; it smelled something like almond extract.

Q44. Do you mean by "it" the material in the can? A. Yes.

By Mr. Watson:

Q45. What did you say? A. It smelled something like almond extract.

By Mr. Free:

Q46. Did you bring that material back to Mr. Jirousek? A. Yes; and I gave it to him.

Q47. Now, you spoke of Mr. Jirousek having an ink. (590) Can you tell us something about that ink and what he did with it, and what it was for? A. Well, the purpose was quick drying, to use on jobs where you would be able to print it and take it in to the bindery right away, and fold it without smearing.

Q48. Is that what the ink was for? A. That was the principal thing.

Q49. Now, did he ask you to use that ink or something of that sort? A. Yes; I was to use it on that job that came in every week, came in at the last minute and had to be in the mail at a certain time.

Q50. Do you remember what job that was? A. It was that Jewish Temple Globe, four-page folder, from Ansel Road or on 105th.

Q51. That was a weekly publication, I think you said? A. Yes.

Q52. Do you remember the name of it? A. The Temple.

Q53. The Temple? A. Yes.

Q54. Did you print this folder with the ink that Mr. Jirousek gave you? A. Yes, sir.

Q55. Can you tell us something about how you used that ink and what sort of results it gave, and so on? A. Well, it was a four-page folder; you were to run one side through and turn it, and run it through again. We were able to do it with this ink without waiting for (591) any time to dry and take it to the bindery to be folded right away.

Q56. Well, now, in order to get this straight in our minds, you spoke of a four-page folder, I believe? A. Yes.

Q57. Just how was that printed? That is to say, how would it be laid on the sheet? A. Well, it would be laid out just like an ordinary sheet and you would run it through once, turn it over and run it through again, so that I could

cut the sheet in half and you would have two copies of it. There would be a front and a back.

Q58. When you speak of sending it through do you mean sending it through a press? A. Yes; the second time to back it up.

Q59. If I understand correctly what you have just said, the four pages would be printed on one side of a sheet of paper? A. That is right.

Q60. And then that same sheet of paper would be reversed or turned over? A. Turned over, yes.

Q61. And sent through the press again? A. That is right.

Q62. To have the same thing printed on the other side? A. Yes.

Q63. Whereupon the sheet would be cut apart into— A. Copies.

Q64. Two copies? A. Yes.

(592) Q65. And then those copies, what was done with them? A. They were folded in the bindery.

Q66. And how did you fold them? A. Well, just made one fold like a book.

Q67. Well, did you do it by hand or by what means? A. By machine.

Q68. You would do it by machine? A. Yes.

Q69. What were the characteristics of this ink that Mr. Jirousek gave you? How did it work? A. It worked fine, as far as drying is concerned, the texture of the ink, there was nothing that I was able to kick about, it felt smooth, laid nice, and then didn't smear on the half tone. That is the main thing in printing; that is, if the half tones dry quickly the type print is bound to be dry quickly.

Q70. Were there half tones in this Temple publication? A. Well, on the first page of it there was a picture of the Temple.

Q71. And you say that the ink did dry rapidly? A. Yes, sir.

Q72. What did that enable you to do? A. To have the work out quicker. We didn't have to wait or let a job like that lay probably anywhere from half an hour to possibly an hour before you would be able to back them up.

Q73. If I understand your answer correctly, when you (593) refer to a wait you mean the wait between the time when you ran the sheet through the press the first time and then ran it the second time? A. That is right; yes, sir.

Q74. Well, what about that wait? How much wait did you have when you were using Mr. Jirousek's ink? A. Just from the time I took it from the front of the press and put it back in the feeder. It wasn't long. I would say it wasn't as long a wait as that. It was just actually putting the stock back in the press, in the back.

Q75. In other words, there was no wait at all, as I understand your answer? A. No wait.

Q76. How many colors were printed on this publication called the Temple? A. This was just black.

Q77. Just black? A. Just black.

Q78. How many copies were run, if you remember? A. It was around 1,700. That would mean 850 sheets because it was run through the press twice. That would give you 1,700. That is where you get your work and turn.

Q79. If I understand your answer correctly, you say that in printing this publication you would run 800 sheets through your press? A. Yes.

Q80. And then immediately, without waiting, run them through again? A. Yes.

Q81. Having reversed the sheets? A. That is right; yes.

(594) Q82. How did the ink act on the press? A. It didn't dry. It stuck right to the rolls. That is what I mean. You know, it didn't dry, but it had just enough texture there to make it smooth. It never dried, even in the can. No consequence of any kind, you know.

Q83. Now, I don't believe that you have fixed the date of your use of this ink on the publication The Temple. Let

me ask you first: Did you use it only once or did you use it a number of times? A. We used it a number of times.

Q84. On that same publication? A. Yes.

Q85. Did you use it on other printing jobs also? A. There was another one that I used it on that was not a rush just like that one was. It was called the Cleveland Engineering Society.

Q86. Getting back to the question of fixing that date, turn your attention, please, Mr. Beres, to the first use of this ink that was given you by Mr. Jirousek, which you can recall, and tell us, as closely as you can, when that was; that is, the first time you used it? A. That was a little after I was married. That is the way I recall it because, as I told you, I told my wife of it. You see, he told me that I was fired. You know, coming at a time like that, I wouldn't be apt to forget it. That was the beginning of his making the ink, I believe, and it was just a short time after that that he gave me the ink to try out.

(595) Q87. Well, about when was it? A. That was within the year, I would say, or possibly within six months from the time that I was over to this place for that chemical, whatever it was, and I remember that it was cold at the time that I went down in the Flats for him, but whether it was in the spring of the year or the fall of the year I couldn't say. That isn't distinct in my mind.

Q88. Did you at that time print a publication called Metal Progress? A. We have printed it at that place, yes, for a long time.

Q89. I mean you, yourself? A. No.

Q90. You didn't work on that job? A. No; my press was too small.

Q91. I would like to have you state for the record, because I don't believe you have, except to say that you ran the press, what your type of work would be called. A. Pressman.

Q92. You are a pressman? A. Yes, sir.

Q93. Or you were a pressman at that time? A. Yes, sir.

Q94. Now, beyond what you have told us, did you know anything about what this ink was or what was in it? A. No.

Q94. Do you know whether or not Mr. Jirousek prepared it? A. Well, I don't know if he prepared it; that (596) is, I never saw him do it, but he brought the ink over to me, and I brought the chemical to him, and all I know is just that there was a sort of almond smell to it.

Q95. Well, now, as to the almond smell, was that characteristic of the ink itself? A. Yes, sir.

Q96. It smelled that way also, did it? A. The ink smelled that way; yes, sir. That is the only way I would be able to check it, that it was different from other inks. I believe that if I had to test it, I would be able to pick it out.

Cross-examination by Mr. Watson:

Q97. When were you married? A. 1931.

Q98. What date? A. September 3.

Q99. What kind of paper was The Temple printed on? A. It was an enameled stock; that would be called dull coated enameled stock.

Q100. Do you know from whom the paper was purchased? A. I couldn't tell you that. We used to get quite a bit of paper from this Petrequin Paper Company on Superior Avenue.

Q101. What is the name of that concern? A. I think it is the Petrequin Paper Company on Superior Avenue.

Q102. Do you know whether or not this paper was what is known as a clay finish? A. Not that I know of.

Q103. It was a dull enameled stock, as far as you know? (597) A. It was dull enameled stock.

Q104. Just what sort of press were you using? A. Kelly-press.

Q105. Describe it, will you please? A. It is just a small highspeed press made by the type founder here and it is

automatic. It took a sheet 17 by 22. That was the largest size. The smallest was 7½ by 11. Of course, it is a high-speed press.

Q106. It was a flat bed press, was it? A. Yes, sir.

Q107. And a sheet fed? A. Yes, sir.

Q108. How long did it take you to print 850 sheets? A. About twenty minutes.

Q109. What was in the receiving end of the press? A. What was in the receiving end?

Q110. What happened to the sheets after they went through the press? A. They went through a gas.

Q111. The sheets went through a gas? A. Yes.

Q112. That was the usual gas flame that they have on that sort of press? A. Yes. We didn't have the spray gun at that time.

Q113. And then where did they go after they passed this gas jet? A. They fed into a jogger box that kept them straight.

Q114. And they piled up sort of loosely in this box? A. No; we had a jogger going. That was the purpose of it, (598) as well as piling them, because he told me to open them up more so that they would scatter more and go together then.

Q115. I don't understand just what you mean by that. A. Well, it was a box affair, you know, and when a sheet comes down it falls open up. When the sheet falls it goes like this. It comes together. It keeps the sheets straight. So that if the sheet was varying either way, which is from one side to the other, it would always put the sheets together so that they would be straight.

Q116. Did the sheets fall printed side down or printed side up? A. Printed side up.

Q117. How did you get those sheets back into the press to print the other side? A. Pull them out and take them in the back, and just turn them over.

Q118. Turn the pile right over? A. Not all at once because you couldn't do it, because you would have them

scattered all over, but just turn them over and put them right back.

Q119. Did this press have any rated, specially rated, speed? In other words, how fast was it supposed to print? A. It all depends upon what kind of work you are running. At that time I was running around 2,500 an hour.

Q120. Could you print 2,500 an hour? A. Yes. You know that was one-color work.

(599) Q121. How long did you stay with the Evangelical Press? A. I just left there about—I don't remember. I believe it was in January. It was around January that they changed hands about eight years ago.

Q122. About eight years ago they changed the name, at any rate? A. Yes.

Q123. You stayed right on through with— A. Yes, sir. I was there seventeen and a half years with Mr. Theuer.

Q124. How long was Jirousek there? A. I believe it was about four or five years. I am not quite sure. I believe it was around four or five years that he was there.

Q125. Do you remember of him being discharged? A. I don't know if he was discharged, or not.

Q126. You know that he left before you did? A. Oh, yes; he left before I did. I don't know what the reason was.

Q127. What sort of can did you bring this stuff in for Mr. Jirousek? A. Do you mean how big it was? Do you mean what it was made of?

Q128. What sort of can was it? Can you describe it to us? A. No, sir.

Q129. Did it leak? A. No, sir.

Q130. How were you able to smell what was in it if it didn't leak? A. It had an odor to it. They might have (600) gotten something on the paper when they were wrapping it.

Q131. Did you smell any of this almond ink after Mr. Jirousek had left the plant? A. No, sir.

Re-direct examination by Mr. Free:

Q132. You spoke of gas in this connection and I believe you stated that you were using at the end of the Kelly press a gas flame? A. Yes.

Q133. That, as I understand it, is a gas flame over which the sheets pass? A. That is right.

Q134. Does it extend the full width of the sheets? A. Yes, sir.

Q135. Does it apply heat to them? A. Yes, sir.

Q136. You were using gas, were you not, with Mr. Jirousek's ink? A. I believe we were.

Q137. You spoke of a spray or, rather, you spoke, as I recall it, of not having sprays at that time. What do you mean by "sprays"? A. The chemical that goes in between the sheets, that is sandwiched in between, and keeps them from offsetting. We didn't have it at that time.

Q138. That, however, is something that is used today, is it not? A. Yes, sir; it is in liquid form and when it comes out it is real fine dust.

Q139. That operates to space the sheets apart? A. Yes, sir; it keeps them from offsetting.

(60) Q140. You spoke of a jogger in connection with this press. As I understand it, that is on the delivery end of the press? A. Yes, sir.

Q141. Does the action of that jogger tend to slide the sheets over each other? A. Yes, sir.

Q142. Does it do so immediately after the sheets are printed? A. Yes, sir.

Q143. When you were using Mr. Jirousek's ink did you have any trouble with the jogger or any effects produced by it? A. No, sir.

Q144. In connection with inks other than the Jirousek ink, Mr. Beres, did you ever have any difficulty in connection with the jogger? A. Yes.

Q145. What was that difficulty? A. It would not set as quick and dry as quick as with Mr. Jirousek's ink.

Q146. And when "it", as you say, did not dry as quick and you had some trouble with it, what kind of trouble was that? That is to say, what happened? A. It would offset. Then we would have to wait longer for it to dry.

Re-cross examination by Mr. Watson:

Q147. Was the printing press that you used just the same regardless of the kind of ink that you used on it, or did you make any changes in the press? A. Well, the difference would be that on bigger presses there are bigger plates.

(602) Q148. I am referring to this press that you were running at that time. Did you change it in any way when Mr. Jirousek gave you some ink? A. No, sir.

Q149. Just the same as it was with regular ink? A. There is nothing to change on it.

Mr. Free: Now the deposition of Charles J. Theuer:

Deposition read in evidence of CHARLES J. THEUER produced as a witness for defendant, who, being first duly sworn, deposed and said:

Direct examination by Mr. Free:

Q1. Will you please state your name, age and residence? A. Charles J. Theuer; fifty years old; 19618 Edgecliff Boulevard, Euclid, Ohio.

Q2. And your present occupation, Mr. Theuer? A. President of Tower Press.

Q3. How long have you been with the Tower Press? A. We organized in 1935.

Q4. And prior to that time where were you? A. With the Evangelical Press.

Q5. Was there any connection between the Evangelical Press and the Tower Press? A. Yes; the Tower Press is a sort of continuation of the Evangelical Press. In 1935 the Evangelical Press went to Harrisburg, Pennsylvania, and we took over the equipment, and organized the Tower Press.

Q6. Is the Tower Press located in the same place that the Evangelical Press was? A. Yes, sir; 1900 Superior Avenue.

(603) Q7. How long were you with the Evangelical Press or from what date to what date? A. Well, I was with it for 22 years.

Q8. That is, prior to the time that you went with the Tower Press? A. That is right.

Q9. Did you know a Mr. Joseph F. Jirousek? A. Yes, sir.

Q10. Will you tell us who he was or is? A. He was the foreman of our press room.

Q11. And by "our" are you referring to the Tower or the Evangelical? A. Evangelical Press.

Q12. Do you know when he came with the Evangelical Press? A. We don't have the records of the Evangelical Press and it is only by certain jobs that went through at a certain time that I remember just the years that he was with us.

Q13. May I ask you whether or not you made a search for the employment records of the Evangelical Press? A. Well, at the time that we took over the Evangelical Press those employment records were taken down to Harrisburg.

Q14. They are not available here? A. They are not available here; no.

Q15. You spoke of fixing the date of Mr. Jirousek's employment by the Evangelical Press. Can you do so, (604) according to your recollection? A. Well, I would say

that he was with us in 1930 and 1931. As I recall it, he was with us just for a period of about two years.

Q16. What was his position at that time? A. He was the foreman of our press room; superintendent of the press room.

Q17. What sort of work was the Evangelical Press doing at that time? A. Publication printing, commercial printing.

Q18. Did the Evangelical Press publish a magazine called Metal Progress? A. Yes, sir.

Q19. Does the Tower Press still publish it? A. Yes, sir.

Q20. Do you know whether or not it has ever been published by anyone else? A. I know definitely that it has not been published by anyone else.

Q21. In other words, then Evangelical and Tower together have done the entire printing of Metal Progress throughout its life as a magazine? A. Yes, sir.

Q22. When was it begun, if you recall? A. The first issue was August, 1930. I think that we printed it in August.

Q23. You printed the first issue in August, when? A. 1930. It was termed the September issue.

Q24. I notice that you are referring to a paper there, Mr. Theuer. What is that? A. This is a job record of the (605) Evangelical Press, card index of all jobs and order numbers listed, and so on, and so forth.

Q25. Where did you get that record that you have with you? A. I got this out of our files.

Q26. By "our files" do you mean the files of the Tower Press? A. Yes.

Q27. Did Tower Press take over those files of the Evangelical Press? A. Yes; it was just a matter that we asked for them so that we could refer back to the card for details and the like.

Q28. When was it that you received those records? You say that you asked for them. When was that? A. Well, they were never out of our possession. We just kept them there.

Q29. In other words, you asked for them at the time that Tower Press was organized and took over the business of Evangelical Press; is that correct? A. Yes, sir.

Q30. Now, this record that you have, Mr. Theuer, what does it show? A. That shows that in August, 1930, we billed the first printing of Metal Progress.

Mr. Free: I offer in evidence the card produced by the witness and showing the first printing of the September 1930 "Metal Progress," as Defendant's Exhibit N-1.

(Marked Defendant's Exhibit N-1.)

(606) Mr. Free: That is the front and the back of the card.

Q31. This publication, Metal Progress, how often is it issued? A. Monthly.

Q32. And has that been true throughout the life of this publication, the printing of which began in August, 1930, according to your testimony? A. Yes, sir.

Q33. Can you tell us anything about the manner in which this publication is sent out, particularly as to the dates of issue and that sort of thing? A. Well, the closing date is changed so often that it is difficult to tell, but we do attempt to get it in the hands of the subscribers around the 15th of the month.

Q34. By that do you mean the month which it is dated? A. Yes, sir.

Q35. You say that it is irregular. Do they approximate that in some way; that is to say, getting it into the hands of the people who read it, around the 15th of each month? A. Yes.

Q36. Has that been true right along? A. Yes, sir.

Q37. Is the entire magazine printed by your company or, rather, I should say, was the entire magazine printed by Evangelical Press or were parts of it printed elsewhere? A. It was all printed by us.

Q38. That then includes the cover? A. That is right.

(607) Q39. Do you recall anything in connection with any issues of Metal Progress involving difficulties in the printing of covers? A. Just what do you mean?

Q40. Well, for example, difficulties with ink in the printing of covers? A. Well, you always have a certain amount of grief, as it were, with the printing of magazines like that, on coated stock, and especially at that time.

Q41. By "at that time" what do you mean, Mr. Theuer? A. Well, at that time they didn't have what we have now, what is called an offset spray to eliminate offset, and that is a chemical that is sprayed over the sheet to prevent offset.

Q42. And by "at that time" do you mean at or about the time that this magazine was started? A. Yes.

Q43. Can you tell me approximately when the sprays, that you have just mentioned, did come into use by you? I am trying generally to fix the time about which you were talking in your last answer. A. Well, we didn't have that equipment with the Evangelical Press. We bought it when we took the thing over as the Tower Press; that is, we bought our offset equipment probably in 1936 or something like that.

Q44. So that I take it from your answer that you did have offsetting troubles at times with the covers of (608) Metal Progress? A. That is right.

Q45. Did Mr. Jirousek have anything to do with that situation? A. Well, it was up to him to print the covers and whether he did it himself, or not, which he didn't, of course, it was up to him to superintend the printing of the covers, as well as the inside and all the way through.

Q46. It was up to him to see that the printing was done without offset trouble, I take it from your answer? A. That is right.

Q47. I hand you a publication marked September, 1931, and ask you if you recognize that? A. I do.

Mr. Free: I would like to mark that for identification as O-1.

(Marked Defendant's Exhibit O-1 for identification.)

By Mr. Free:

Q48. What is it, please? A. Well, it is a September, 1931, issue of Metal Progress which we printed.

Q49. Do you recall anything in connection with the printing of that particular issue, and especially the cover of it? A. This job was going through every month, of course, and it is pretty hard to remember the details; in fact, I didn't attempt to do so. However, this particular issue has aluminum printing on it. Whether that was the first issue, I don't remember.

(609) Q50. Does that recall anything to you? A. Well, aluminum printing is more difficult to print than regular ink.

Q51. Well, then, I take it that your answer is that you don't recall anything special in connection with the September, 1931, issue of Metal Progress, excepting that it was printed with aluminum ink and aluminum ink did present some problems? A. That is right.

Q52. You spoke of offset difficulties in printing covers for Metal Progress and that it was Mr. Jirousek's job to correct those difficulties. Do you know of anything in particular that he did in that connection? A. Well, I know that we eliminated offset as much as possible and the proof that we continued the printing of the magazine would indicate that we satsified the customer on that score.

Q53. Do you know of anything that Mr. Jirousek did in that connection to eliminate offset?

Mr. Watson: I object to that as leading as the witness has already answered the question to the best of his recollection.

The Court: The objection is overruled.

By Mr. Free: (Continuing.)

Q54. Go ahead, Mr. Theuer. If you can do so, answer the question. A. Well, I know that Mr. Jirousek was (610) always doctoring up ink and doing his best to lick this problem of offset.

Q55. Did you ever see him doctoring up ink? A. Oh, I might have seen him at times at the mixing table and whatnot.

Q56. Did you see any ink used that he had doctored? A. Naturally, I saw it on the press while it was running if I went out there to see it running.

Q57. In the course of your duties then you do observe the running of the presses frequently and keep an eye on that sort of thing? A. Yes, sir.

Q58. So that in observing the runs of these inks what did you find? How did they run? What did they do? A. Well, they printed the job as we have it here.

Q59. Well, you have spoken of offsetting troubles. What was there about them in connection with Mr. Jirousek's ink?

Mr. Watson: I make the same objection, as the witness has already answered the question.

The Court: The objection is overruled.

By Mr. Free: (Continuing.)

A. Well, as I say, the job was satisfactory to the customer and we ran it with the least amount of offset possible. In some instances we eliminated the offset entirely.

(611) Q60. Will you tell us something about the printing of the cover for Metal Progress? How is that done? A. It is printed one color at a time. The front and back are printed at the same time in what we call a work and turn form. The inside pages of the cover are locked up over here and then the sheet is reversed, and the inside

printing here is backed up with the cover then the next time that it goes through the press.

Q61. Are the sheets then subsequently cut apart? A. That is right.

Q62. Considering the cover of September, 1931, issue of Metal Progress, which you have before you, how many colors do you find there? A. Three colors including the aluminum.

Q63. Besides the aluminum the other colors are what? A. Orange and black.

Q64. Are you able to tell from examining that cover the order in which the colors were printed? A. This looks as if the aluminum was printed first on this and the black is printed over it.

Q65. Can you state that from your examination of that cover? A. Yes; I would say so because I see some of the aluminum showing through here on some of the black printing.

Q66. Does the printing of black on aluminum in a (612) printing job of that kind, or not, involve offset difficulties? A. Yes, sir; it does.

Q67. Could you tell by an examination of that magazine whether or not the offset difficulties had been overcome? A. Yes; I would say they had.

Q68. Referring again, Mr. Theuer, to these inks of Mr. Jirousek, what drying characteristics did they have? Were they slow or fast? A. I know that Mr. Jirousek was experimenting and working with a fast drying ink. That was his purpose, I think, in all of his experimentation.

Q69. That was what he was working on, you said. Did he produce a fast drying ink? A. To the best of my knowledge, he did; yes.

Q70. Did you see it in operation? A. I saw it on several jobs that we had.

Q71. Can you state something about how it was used and what its drying characteristics were, as you observed

them? A. Well, I know that it dried so quick that sometimes it would dry on the rollers and then on the press plate.

Q72. How about on the sheet? A. Well, it dried quicker than ordinary ink would.

Q73. How is a sheet handled in a press? Is anything done to dry it? A. Yes; it goes over a flame. It goes over a gas flame.

(613) Q74. And that applies heat to it, does it not? A. That is right.

Q75. Now, you spoke of the rapidity of drying of these inks. What did that mean in terms of printing operation? What was it good for? A. Well, you could put the sheets through the press that much faster and eliminate offset.

Q76. Are you referring now to a single printing operation or a plurality of printing operations? A. Well, one would involve the other. Let me say it this way: If the first color goes through the press and dries quickly, you can put the second color on that much quicker.

Q77. Are you referring now to the same sheet of paper or different sheets, or both sides of a sheet of paper, or both? A. Oh, both. You can turn your sheet if your ink is dry, of course.

Q78. That is, in making a work and turn job, such as you have referred to? A. Yes, sir.

Q79. If the sheet is not dry, what happens when you work and turn? A. Well, you just can't print it. That is when you run into a smudging and smearing, and that sort of thing.

Q80. Well, for the sake of the record, does that smudging and smearing all occur on the press or is it (614) between the sheets of paper, or both, or what? A. Between the sheets of paper.

Q81. After they have passed through the press? A. After they have passed through the press.

Q82. Does the smearing also occur on a press in a work and turn operation? A. Yes. The opposite side, if your

sheet is not dry, would put an impression on what we call the cylinder tympan or the tympan.

Q83. Can you tell us, for the record, what that is? What is the tympan on a press? A. The tympan is really the last sheet that goes on the cylinder after the so-called make ready sheets have been put on the cylinder.

Q84. And that sheet stays on the cylinder, does it not, through the printing operation? A. Yes.

Q85. Now, you spoke of smudging trouble and I take it that your answer means that if you have offsetting trouble you smudge on the tympan? A. Yes.

Q86. Is that correct? A. Yes.

Q87. Does that, or not, interfere with the printing operations? A. Definitely so.

Q88. You spoke of observing the use of inks prepared by Mr. Jirousek and indicated that they dried rapidly. Did they dry rapidly enough, or not, to eliminate smudging as between the sheets? A. Yes; I would say that they did.

Q89. Did they dry rapidly enough, or not, to prevent (615) smudging of the tympan? A. It eliminated it to a great extent.

Q90. Did you ever see a work and turn operation performed with Mr. Jirousek's ink? A. I suppose I should say that this particular cover was a work and turn proposition.

Q91. Well, would you know whether or not that cover was made with Mr. Jirousek's ink? A. I wouldn't know definitely; no.

Q92. Then, as to the date when you did see the use of Mr. Jirousek's inks, can you give us anything as to that? A. Well, it was in the course of his demonstration and I would say it was in 1931. I really don't know when he did start doing the experimenting. I can't say that definitely.

Q93. Do you recall any particular jobs on which, according to your recollection, Mr. Jirousek's ink was used? A. I can't recall any particular jobs. I know that he was work-

ing primarily on this Metal Progress proposition because it was the only monthly publication that we had at that time and it gave him the best chance to experiment.

Cross examination by Mr. Watson:

Q94. Did the Evangelical Press purchase the paper on which this magazine Metal Progress was printed? (616) A. No; the publisher alway furnished that paper.

Q95. Who was the publisher? A. American Society for Metals.

Q96. The publisher had the paper shipped into your printing plant, did it? A. Yes, sir.

Q97. Do you know from what paper company it came? A. Well; it was bought through the Milleraft Paper Company and they deal with the Champion Paper Company, and I just assume that it came from them.

Q98. You think that it came from the Champion Paper Company? A. Yes.

Q99. Where did you get this number which is marked September, 1931; that is, this number that was referred to in your deposition? A. Well, I didn't get it.

Q100. You didn't see this particular copy until you came here today? A. That is right.

Q101. Is it your understanding that this is the first number that you published, this September, 1931, number of Metal Progress? A. No, sir. The issue of September, 1930, was the first.

Q102. You haven't that one here, have you? A. No.

Q103. Do you remember when Mr. Jirousek left the Evangelical Press? A. The best I can recall is that it was in 1932 some time.

Q104. Do you remember why he left? A. No; he left (617) of his own accord. He was doing some patent work or something like that. I don't know what it was. He was working on this ink proposition.

Q105. I understand that you personally didn't pay any very great amount of attention to his experimental work in your plant? A. That is right.

Q106. You were printing mostly with ordinary linseed oil inks, I suppose? A. We were buying the inks mainly at that time from Charles Enen Johnson & Company and whatever their inks consisted of we were printing with those.

Q107. Did you have any sheet fed presses? A. All of our presses are sheet fed.

Q108. You didn't have any web presses? A. No, sir.

Q109. What type of press was this magazine Metal Progress printed on? A. That was printed on what we call a Miehle automatic, 25 by 38.

Q110. Is that a flat bed press? A. Flat bed press, yes. I would like to qualify that. We had a large Kelly at that time. Whichever press was available at the time would be used for printing it. It was either on the Miehle or the large Kelly.

Q111. They were both flat bed presses? A. That is right.

Q112. They print only one side at a time? A. That is (618) right.

Q113. And then some time in 1935 you got this spray to prevent offset? A. It was soon after we took over the Tower Press, either 1935 or 1936.

Q114. Was that fully effective in eliminating offset? A. Yes.

Q115. In your ordinary work with these Miehle presses, how soon did you back up? A. Are you speaking with the spray now?

Q116. Yes. A. Well, we can back up, say 2,000 impressions, up to 2,000 impressions, and then put the first sheet through again.

Q117. How long is the interval between the first and the two thousandth? A. About two hours. Of course, you understand that it depends upon the nature of the job. A

good deal depends upon what kind of paper it is printed on. Ink, of course, will dry on some papers quicker than others. It is often a question of whether it is dry, or not.

Q118. Well, you back up quicker since you have that spray than you did before, I suppose? A. That is right.

Q119. Have you ever, in connection with your two presses, made your own inks or have you always bought them? A. We have always bought them.

Q120. Then it wasn't part of Mr. Jirousek's job to (619) make ink, as I understand it? A. No, sir.

Q121. Did you use any of the inks that he doctored up after he left? A. That I don't know. I couldn't say.

Re-direct examination by Mr. Free:

Q122. How soon could you back up after using Mr. Jirousek's ink? Do you recall? A. I don't recall.

Q123. Would you say that you could back up as quickly as you could with the spray? A. Personally, I wouldn't take the chance on any ink that I would with a spray job.

Re-cross examination by Mr. Watson:

Q124. Do you know whether or not this magazine, the September, 1931, issue of Metal Progress, is printed on clay coated paper? A. Are you speaking of the inside now, or the cover?

Q125. I will ask you about both. Do you recognize the paper? A. Yes; it is what we call a coated sheet. Later developments have made a sort of what they call a process coated which I understand is done right on the machine in the original making of the paper, but that hadn't been developed at that time. Yes; I would say that that is a clay coated sheet.

(Recess to 2:00 p. m.)

(620) AFTERNOON SESSION.

Mr. Free: I am continuing to read from page 44 of the depositions, this being the deposition of Charles J. Theuer:

Q126. Mr. Theuer, I see that you have another card with you. Will you state what that is? A. This is a record of printing that we did for the Charles Eneu Johnson Company in 1932.

Q127. What did you print for that company at that time? A. Just some miscellaneous jobs. There happens to be six jobs listed on this card.

Q128. Were all of those jobs for Charles Eneu Johnson Company? A. That is right.

Q128. Where did this card come from, Mr. Theuer? A. It came from the files of the Evangelical Press which we have.

Q129. The same files that you mentioned before in your testimony? A. That is right.

Q130. I see on that card a notation "Believe it or not folder." Do you know what that was? A. It was a folder describing a special ink known as a non-scratch ink, or something of that sort; quick drying ink.

Q131. Can you be more specific than that? What special ink was it? A. The ink that Mr. Jirousek had perfected.

(621) Q132. That was a folder, was it not, printed for Charles Eneu Johnson & Company? A. That is right.

I will offer in evidence that folder as Defendant's Exhibit P-1.

Mr. Watson: I object to it as immaterial and I move to strike out the testimony of the witness as to the circular as being secondary. The circular should be produced if it is in existence—and irrelevant.

The Court: This is a separate exhibit from the circular?

Mr. Free: Yes, your Honor: That just shows the time when that circular was printed. The circular is coming in now.

The Court: All right. You will produce the other?

Mr. Free: Yes.

The Court: Objection overruled.

(Marked Defendant's Exhibit P-1.)

By Mr. Free:

Q133. Do you know anything about that circular, Mr. Theuer? A. Well, it was recalled to my mind and I saw it yesterday.

Q134. Do you have a copy of it? A. No; I don't have a copy of it.

Q135. Do you remember what it was about other than (622) in general, as you have testified, it was about the Jirousek ink?

Mr. Watson: I object to that as secondary.

The Witness: I don't recall the wording on it.

Mr. Watson: That is objected to, your Honor.

The Court: There isn't any way of proving anything about this ink.

Mr. Free: No, the circular is coming in. As a matter of fact he is leading up to it in that way.

The Court: Overruled.

By Mr. Watson:

Q136. By the way, what was your job with the Evangelical Press around the '30s? A. I was manager.

By Mr. Free:

Q137. Mr. Theuer, I hand you a printed paper and ask you if you can recognize that. A. Yes; I recognize this.

Q138. What is it, please? A. It is a six-page folder entitled "Believe it or not."

Q139. Is that, or not, the "Believe it or not" folder that you referred to in your former testimony in connection with Defendant's Exhibit P-1? A. This is the folder.

Q140. Your testimony then is that that is the folder (623) referred to in this exhibit? A. That is right.

Mr. Free: I offer in evidence as Defendant's Exhibit Q-1, the folder just identified by the witness.

Mr. Watson: This exhibit is objected to as a self-serving declaration and as completely irrelevant. I think perhaps your Honor might examine the exhibit on that.

Mr. Free: The folder speaks for itself (handing to the Court).

The Court: What do you offer it for, to prove what, something about this ink?

Mr. Free: Yes. That describes the ink which was sold, and it is a sample of the ink which is here mentioned.

The Court: Back in 1932?

Mr. Free: Yes, in the Spring of 1932.

Mr. Watson: On the contrary, it has a lot of self-serving declarations about what a wonderful thing has been produced. It has nothing to do with the composition of the ink at all. I think it is entirely inadmissible.

Mr. Free: It isn't self-serving because the defendant did not make it. It was Charles Eneu Johnson who put out that circular.

The Court: Then call that company. This is (624) nothing but an advertisement.

Mr. Free: Yes. We have someone called later.

The Court: I will reject it for the present. Objection sustained.

Mr. Free: Would you mark that for identification Q-1, please.

(Marked Defendant's Exhibit Q-1 for idenfification.)

Mr. Byerly: I think, your Honor, the preceding exhibit was admitted subject to this one, and should now be stricken out. That is the record of printing this advertisement.

The Court: It will be stricken so far as it refers to this advertisement—so far as this circular, rather, Defendant's Exhibit Q-1. For the other purpose it is being admitted, if there is any other probative purpose for it.

Mr. Free: It is referred to by Mr. Theuer of his printing of this circular.

The Court: He may use it to refresh his memory, as an exhibit.

Mr. Free: Yes.

The Court: I think I will reject it. Strike it out.

Mr. Watson: If your Honor please, Questions 141 through 150 on cross examination relate to the rejected (625) exhibit, so I shall not offer those so long as the exhibit is not in evidence.

The Court: Very well.

Mr. Watson: I shall turn to Question 151 on page 49:

Mr. Free: I think I will put these questions and answers in, your Honor——

Mr. Watson: I believe, your Honor—excuse me.

Mr. Free: Under Rule 43(c), Offer of Proof.

Mr. Watson: If you will remember, your Honor, I attempted to do the same thing in connection with that little formula card, which you rejected as evidence, and I attempted to identify it further through questions asked by Mr. Free, and you said if he did not want it in I could not put it in. Now these questions which Mr. Free is attempting to put in are on the same category, that is, questions that I asked and which did not go in, and he is attempting to put that in.

The Court: He can put them in as an offer of proof.

Mr. Free: That is all I am doing, under Rule 43(c).

The Court: It isn't necessary to read them. Give them to the stenographer.

---

(626) **The offer of proof under Rule 43(c) is as follows:**

Q141. Did you write this circular? A. No, sir.

Q142. It simply came to you as it is, a job to be printed and you printed it? A. That is right.

Q143. It is printed on clay coated paper, too, isn't it? A. Yes, sir; or coated paper.

Q144. There is nothing whatever on the circular to identify it as having been printed on your press, is there? A. To indicate that we printed it, do you mean?

Q145. Yes. A. No; only— It is definitely our type and our general makeup, and I would say as to the type used that this inside is what we call the No. 3 Caslon type, which we have, and this heading here is Metropolis bold type which we were using exclusively at that time; that is, I mean that that is the only way that I can tell that, because we had that particular type at that time.

Q146. You weren't the only print shop in the country that had that type at that time? A. No, I wouldn't say that, but here it is the same. This heading here is the same type as was used in the heads here in Metal Progress. We bought that type specially for Metal Progress at the time and have kept it primarily for their use the same as this here.

Q147. Have you any recollection of——

(627) Q148. Is that correct? A. That is right.

Q149. You say you saw this circular, Defendant's Exhibit Theuer F, a few days ago? A. Yes.

Q150. Have you any recollection of actually seeing it before that? A. Oh, yes; I remember of printing that.

Deposition of Charles J. Theuer, for Defendant—Re-cross—Re-direct.

Re-cross examination by Mr. Watson:

Q151. According to your card, Defendant's Exhibit Theuer C, your order for September Metal Progress was a little over 8,000 copies, was it not? A. That is right.

Q152. How long did it take from the time that this number of Metal Progress went to press to the time when it was ready for delivery? A. Well, it is pretty hard to say because we print it in forms. Oftentimes we have the first 32 pages ready and we will print those and get those out of the way. I would say that after the closing or after all the type is set up and forms are locked up, from a week to ten days.

Q153. To get out an edition of 8,000? A. Yes, sir. I would just like to qualify that. I was thinking more of our edition now which is a whole lot larger than it was at that time, and also the book is also increased in size. It wouldn't take that long to get out 8,000 (628) copies.

Q154. You mean that it wouldn't take that long now to get out 8,000 copies, but how long did it take in 1930? Do you remember? A. Well, about a week.

Re-direct examination by Mr. Free:

Q155. You spoke of finishing the first 32 pages, I believe, in one of your answers on cross examination. The interior portion of the magazine was printed, I gather from that, in sections? A. That is right.

Q156. How was that done? A. It was printed sixteen pages at a time.

Q157. Sixteen pages on one side of the sheet? A. That is right.

Q158. Was the sheet thereafter turned over for more printing? A. Yes, sir.

Q159. Would they be the same sixteen pages or another sixteen pages? A. They made a work and turn form. They took the first sixteen and then the back sixteen.

Q160. In any event, the sheet was turned and printed both sides, as I gather from your testimony? A. Yes, sir.

Q161. In making those runs, what was your usual procedure? You would run the sheets, I take it, through the press once to print the sixteen pages on one side and did you then immediately reverse the stack and run (629) the sheets through the press again, or was there an interval? A. Well, an 8,000 work and turn sheet would mean only 4,000 impressions and ordinarily we would let that dry a few hours after getting 4,000 done to make sure that it was completely dry.

Q162. One other question, Mr. Theuer. At the time that the printing of Metal Progress was started, as you have testified, in August, I believe, of 1930, was, or was not, Mr. Jirousek at that time with the Evangelical Press, if you recall? A. I don't recall.

Now the deposition of Lewis E. Nichols.

Deposition read in evidence of Lewis E. Nichols produced as a witness for defendant, who, being first duly sworn, deposed and said:

Direct examination by Mr. Free:

Q1. Please state your name, age and address? A. My name is Lewis, L-e-w-i-s E. Nichols; 46 years old; and the address is 17416 Oxford Avenue, Cleveland, Ohio.

Q2. Where are you employed at the present time, Mr. Nichols? A. Charles Eneu Johnson & Company, Cleveland.

Q3. What do they do? A. We sell printing inks.

Q4. Are those inks manufactured in Cleveland or elsewhere? A. The base colors are manufactured at Philadelphia and we have what we term a rehandling plant here in Cleveland.

Q5. What do you mean by "base colors"? A. What we term a base color is a combination of dry color and varnish, full strength dry color and varnish

(630) Q6. What is the nature of your duties with the Johnson Company? A. Do you mean now?

Q7. Yes. A. I am superintendent of manufacturing.

Q8. How long have you been with the Johnson Company? A. Since 1914, but I was out two years for the war.

Q9. Do you know Joseph F. Jirousek? A. Yes.

Q10. Did the Johnson Company ever manufacture inks in accordance with the instructions received from Mr. Jirousek? A. Yes.

Q11. Who did that? A. I did.

Q12. Can you give me any idea of the date when you began to do that? A. Well, approximately the end of 1931 or the beginning of 1932.

Q13. In making these inks what did you do? A. I worked under him.

Q14. By "him" you mean whom? A. I worked with Mr. Jirousek on this thing.

Q15. Yes? A. In other words, he had, as I would put it, the original idea and I worked with him on it.

Q16. Can you tell us more specifically just what sort of thing you did at that time in connection with the Jirousek's inks, that we are talking about? A. Well, Mr. Jirousek had this idea and he discussed it with me, the possibilities of making a quick setting ink, and through him—let me put it this way: His idea was to incorporate certain (631) varnishes with regular printing ink to accomplish his purpose.

Q17. Yes. Now, did you make some inks in accordance with his instructions? A. I did.

Q18. Can you tell us how you did it? That is, what did you use and where did you get it? A. Well, this was done by the use of certain base colors that we had, with the addition of the vehicles, as they are called, that Mr. Jirousek had.

Q19. Do I understand from your answer that the Johnson Company used its own ink base or, rather, that you used the Johnson Company's ink base? A. That is right.

Q20. The pigment and the varnish? A. That is right.

Q21. And that you added to that, in accordance with the instructions of Mr. Jirousek, some materials which he furnished? A. That is right.

Q22. Did you have a formula for doing that? A. I just don't know how to answer that. We did arrive at a certain definite formula, but it was as a result of a certain amount of experimental work before we arrived at this certain formula.

Q23. Did you have something written down somewhere which would tell you how much of the various ingredients to put in there? A. Yes, sir.

(632) Q24. What was that? How did you keep it? A. We kept it in our records at the office.

Q25. Have you consulted your records to see if you could find any such formulas for the inks that we are speaking of? A. Yes.

Q26. Did you find any? A. We did.

I will skip Questions Nos. 27 and 28.

Q29. You have now handed me some papers. Will you tell me just what these are and where you got them? A. They are formula sheets from our permanent records of formulas.

Q30. Have they been kept in your permanent records? A. That is right.

Q31. Who removed them from your permanent records? A. I did.

Q32. When, please? A. This morning.

Q33. Did they come out of a large book? A. They came out of a large loose leaf binder.

Q34. You spoke of these things, I think, as formula sheets? A. That is correct.

Q35. Can you point out on the paper, which I now hand you, any formula for a Jirousek ink? A. This one on this sheet and the three on the other sheet.

The witness then pointed to formula No. S 58929, and formula No. S 58850, and I will introduce in evidence (633) this sheet as Defendant's Exhibit R-1.

Mr. Watson: If your Honor please, I object to the exhibit on the ground that it shows symbols which are not self-explanatory and therefore do not indicate the composition of the ink.

The Court: I have not seen the exhibit.

(Same handed to the Court by Mr. Free.)

The Court: Well, if that is explained, it can go in; otherwise not.

Mr. Free: Yes. He does physically produce the parts of his file.

Mr. Watson: Am I to understand then, it is to be marked for identification at this time?

The Court: Mark it for identification only.

(Marked Defendant's Exhibit R-1 for identification.)

By Mr. Free:

Q36. Referring to the formula, which you have identified by the number given above, I notice the words "Perspective H T black" appear hereon. What does that mean? A. That means this particular type of quick drying ink or this particular type of quick setting ink.

Q37. And what particular type of quick drying or setting ink do you mean? A. I just don't understand.

Q38. In other words, do you mean the Jirousek ink about which you are speaking? A. Yes.

(634) Q39. Referring to the items in this formula, the first item, under the column headed "Pounds", reads 33, and under the word "Color" appears "Black", and then

under the word "Number" is "506" and then there is a batch No. 6634. Can you tell me what that material was?

Mr. Watson: I object to that. It is a matter of record. I think that we should have the records. I would like to ask the witness first whether his company has records explaining these various numbers and symbols. Has it?

The Witness: It has; yes, sir.

Mr. Watson: In that case I object to any oral testimony.

The Court: I think I will sustain the objection unless he accounts for the absence as being lost, and therefore gives secondary evidence.

Mr. Free: He explains where they are, your Honor.

Q40. Can you get those records? Do you have them here in Cleveland? A. We don't have them here. They are all formulas.

Q41. Where are they located? A. They are located in Philadelphia.

Q42. Do you have knowledge of what these materials (635) are? Let me put it this way: Do you know of your own knowledge what the material is about which I have just asked you? A. I do not have a definite knowledge of the formulas of those base colors.

Mr. Watson: Your Honor, it seems to me the objection is good. This being secondary, it applies to all this testimony. He was asked to produce all the records and he failed to do so.

Mr. Free: He is asking about each item.

The Court: He is not testifying as to his own knowledge.

Mr. Free: But he knew something. For example, he knows some of them but not all of them.

Colloquy of Counsel.

Mr. Watson: I have not said anything previously, your Honor, because this demonstrates the extent of his ignorance. I think his testimony is really entirely immaterial. I think it should be all stricken out.

The Court: I think so, too. Strike it out. From where on?

Mr. Watson: It starts with Question 43 where he says: "I do not have a definite knowledge of the formulas of those base colors."

The Court: 43?

Mr. Watson: Yes, your Honor, on page 59.

The Court: 43 to where?

(636) Mr. Watson: I have not come to the end yet, your Honor (examining record).

All of the testimony from Question 43 through Question 127, on page 71, relates to the formulas produced by the witness and to his operations in accordance with such formulas. I believe that is all immaterial.

The Court: All right.

Mr. Free: On page 64, your Honor, he says even though he may not have known what the parts were, he put them together and made inks out of them, and they sold——

The Court: He has already testified he made that ink.

Mr. Watson: Yes, sir.

Mr. Free: He says he saw it used on page 65.

The Court: He has already testified to that.

Mr. Free: Not this witness.

Mr. Watson: Not this witness, no, sir.

The Court: Somebody else. What question is that?

Mr. Free: Page 64—well, your Honor, to make it continuous, I will go down to Question 85 on page 64:

Q85. Did you see any of the inks so manufactured and sold shipped out by the Johnson Company of Cleveland? A. Yes.

The Court: Well then that is all right.

(637) Question 85 on page 64 is admitted.

Mr. Free:

Q86. What was the purpose of this ink?

The Court: Strike that out.

Mr. Free: And question 88:

Q88. Mr. Nichols, in connection with your manufacture of this ink did you in any way use it and test it? A. I did not use it personally, but I have seen it used. I have also tested it.

I think that is proper. The witness physically tested it.

The Court: But he said he did not use it personally. So how could he have tested it if he did not use it.

Mr. Free: He said he saw it used. He said, "I have also tested it." That is in answer to question 88.

The Court: No, I will strike that out, too.

Mr. Free: Question 89, he said he saw it used in the plant of the Evangelical Press at that time.

The Court: That tends to corroborate other testimony. I will admit Question 89 and the answer thereto.

Mr. Free: And Question 90:

Q90. Were any tests made at all in the plant of the Johnson Company? A. We made what I would call crude tests with a proof press and a small electric furnace (638) supplying the heat or, I should say, a small electric hot plate.

The Court: That goes out.

Mr. Free: Question 91:

Q91. In the course of running those tests did you print sheets with this ink? A. Yes.

The Court: That goes out.

Mr. Free: 92:

Q92. Was it your practice to do so in connection with the various batches of ink that were made up? A. Yes.

The Court: That goes out.

Mr. Free: Question 93:

Q93. That is, of this kind? A. Yes, sir.

The Court: Do you object to that?

Mr. Watson: I think all of this testimony is objectionable, your Honor, unless we have definite proof as to what the ink was. I mean here is testimony that something was used and we do not know what was used. It is all immaterial.

The Court: It is immaterial.

Mr. Watson: As the record stands.

Mr. Free: He is talking about a certain ink and he is telling us what he has seen.

The Court: But he is not able to identify the ink.

(639) Mr. Watson: No, sir.

Mr. Free: He described it as some ink he mixed up from materials which were furnished to him.

The Court: That does not make any difference.

Mr. Free: I would like to offer the questions that have been excluded under Rule 43(c).

The Court: Very well. Make a note that they are excluded by the Court and offered in conformity with that rule.

Offer of Proof.

Evidence to which objection was sustained by the Court but offered under Rule 43(c), is as follows:

Q43. What were those base colors? How would you know what to use? A. I don't quite get you on that, if I may put it that way.

Q44. I will rephrase the question. If I asked you for 33 pounds of black No. 506, batch No. 6634, would you know what to give me? A. Yes.

Q45. What would it be? A. It would be a litho base black.

Q46. Manufactured by whom? A. Charles Eneu Johnson & Company of Philadelphia.

Q47. Is that, or not, a standard material produced by that company? A. As far as I know, it is.

Q48. Well, your recollection, I think, extends to (640) 1914. What can you say as to whether or not that is a standard material and has been from 1914 on? A. Well, I would say that is has, to my knowledge, been used as a base material since that time.

Q49. Now, by "base material" you mean what, Mr. Nichols? A. Well, this is getting complicated.

Q50. I mean in general. A. Well, we, as the Cleveland branch of Charles Eneu Johnson & Company, do not manufacture from raw materials. We work from base inks. These bases that we use in the formulas of our inks are all made up by our Philadelphia plant and they are supplied to us by our Philadelphia plant.

Q51. I take it that your testimony is that the particular black, about which I have been inquiring, is a base ink made by the Philadelphia factory of your company? A. That is correct.

Q52. And is supplied to you as such? A. That is right.

Q53. How about the next item, "Blue, C 3841, D 2432"? A. That would fall in the same category.

Q54. Would the next item, the purple, fall in the same category? A. Yes, sir.

Q55. What is the fourth item, b-r-o-n-z-i-n-e, bronzine? A. That is another base material.

Q56. Are all these base materials manufactured by (641) your company? A. I am not sure about the bronzine. The others are.

Q57. The bronzine might come from elsewhere? A. That might come from some place else.

Q58. The next item on that formula is "aluminum hydrate dry." Do you know what that is? A. I do not know the chemical formula of aluminum hydrate dry.

Q59. Do you know whether or not it is a material employed in inks? A. Yes, sir.

Q60. The next item is listed as "compound No. 600." State what that is, if you know. A. I do not know.

Q61. I call your attention to the next item, listed as "Cobalt drier," and ask you what that is. A. That is purchased by us regularly from the Harshaw Chemical Company.

Q62. Is it a material with which you work all the time? A. That is a material which we use in the formulation of inks.

Q63. Is the next item marked "Kerosene" ordinary kerosene? A. That is ordinary kerosene purchased from the Standard Oil Company.

Q64. The next item is marked "C. C. S." What is that? A. That I don't know.

Q65. Where did you get it? A. That was supplied by (642) Mr. Jirousek.

Q66. That was a material supplied by him? A. Yes, sir.

Q67. What about the next item noted here as "Blac"? A. That should be b-a-l-e. That is a typographical error. That is a material that was secured from Mr. Jirousek.

Q68. Did he furnish both of those materials to you? A. That is right.

Q69. What about the last item on the list, "Vioflor"? A. That is a reodorizing agent which gives it a different smell. I don't remember where that came from.

Q70. Now, did I understand you to say that as to the two items marked "C. C. S." and "Blac" which you say should be Balc, those were materials furnished by Mr. Jirousek and you don't know what they are? A. I do not know what they are; no, sir.

Q71. Did you ever make inks in accordance with the formula above identified? A. Yes.

Q72. For what purpose were those inks made? (Objected to and question cancelled.)

Q73. Did you make inks exactly in accordance with this formula? A. Yes.

Q74. Did you do it once or more than once? A. More than once.

Q75. Was it, or not, for a time a matter of regular manufacture with you? A. Yes.

(643) Q76. For what? What was done with the ink which you so manufactured? How was the ink used, if you know?

Q77. Go ahead, Mr. Nichols. A. Will you phrase that again?

(Question read.) A. It was sold to printers.

Q78. Do you know that to be true? A. Yes.

Q79. May I ask how you know it? A. By referring to our records.

Q80. By whom?

Q81. After you had manufactured the inks in question what did you do with them? A. I put them in cans and prepared them for sale.

Q82. And in preparing them for sale what did you do? A. I don't understand you.

Q83. This is possibly leading, but I will ask you this: Did you paste labels on the cans or other containers containing any such material? A. Not personally. The man in charge of the shipping department did that part of it.

Q84. Were you, yourself, personally concerned in the manufacture of the inks? A. Yes.

Q85. Did you see any of the inks so manufactured and sold shipped out by the Johnson Company of Cleveland? A. Yes.

Q86. What was the purpose of this ink? A. Shall I go right ahead?

(644) Q87. Yes, if you please? A. This ink, in our opinion, had an advantage over any other ink that we manufactured in that when subjected to heat it was very fast setting and was faster setting than any ink that was supplied by any other ink manufacturer.

Q88. Mr. Nichols, in connection with your manufacture of this ink did you in any way use it and test it? A. I did not use it personally, but I have seen it used. I have also tested it.

Q89. Where? A. In the plant of the Evangelical Press at that time.

Q90. Were any tests made at all in the plant of the Johnson Company? A. We made what I would call crude tests with a proof press and a small electric furnace supplying the heat or, I should say, a small electric hot plate.

Q91. In the course of running those tests did you print sheets with this ink? A. Yes.

Q92. Was it your practice to do so in connection with the various batches of ink that were made up? A. Yes.

Q93. That is, of this kind? A. Yes, sir.

Q94. Would you say that you made such a test of each batch of ink so produced? A. Yes, sir.

Q95. What was your personal experience then with this ink in these tests? A. My experience was that this ink set much more rapidly than any ink that we had produced before.

(645) Q96. The formula, about which we have been speaking, Mr. Nichols, what color of ink was that? A. Black ink.

Q97. I call your attention to another sheet, that you have produced and which you have stated was also a formula sheet upon which, I believe you said, there ap-

peared three formulae for Jirousek's inks. Will you please point out which three of the formulae on that sheet you refer to? A. They are S 59253, perspective process yellow, for the Nels Press, Cleveland; S 59254, perspective process red for the Nels Press of Cleveland; and S 59255, perspective process blue for the Nels Press of Cleveland.

Q98. May I ask you whether or not the term "perspective" or the term "process" or both of them, were terms which were restricted in your use of them to the Jirousek inks at that time? A. The word "perspective" always refers to Mr. Jirousek's inks.

Q99. Considering the formula No. S 59253, and particularly the first three items, "yellow," "yellow" and "orange," what would you say those are or were? A. They are base colors that are supplied to us by our factory in Philadelphia.

Q100. In the regular course of manufacture, or otherwise? A. Well, in the regular process of conducting our business in Cleveland.

Q101. And referring to all three of these formulae, (646) is it true, or not, that the materials set forth as "dry aluminum hydrate", are the same materials that you testified about before, or otherwise? A. They are the same materials.

Q102. In each of these formulae is it correct, or not, that the materials labeled "C. C. S." and "Balc" appear? A. Yes.

Q103. Is your testimony concerning those materials the same as before? A. Yes, sir.

Q104. Do I understand from your testimony that the material marked "Balc" in these formulae is the same as the material marked "Blac" in the formula of Exhibit H? A. Yes.

(Formula sheet marked Defendant's Exhibit I.)

Q105. In the three formulae, to which you have referred, on Defendant's Exhibit Nichols I, I notice the name "Nels

Press". What does that mean? A. That is the printing department of the General Electric Company.

Q106. Does that have anything to do with the inks made under these formulae? A. They were furnished for that customer of ours; yes, sir. That is all.

Q107. As a matter of fact, did they buy these inks, or not? A. Yes, sir.

(647) Q108. Do you recall any of these particular inks being shipped to Nels Press, yourself? A. Not personally. Not without looking up our records.

Q109. Is it, or not, the practice of your company in connection with ink formulae to put down the names of the customers in connection therewith? A. That is right; yes, sir.

Q110. Is that true of the other formulae on Exhibit Nichols I? A. Yes, sir; that is right.

Q111. Is your testimony concerning the personal making of tests by you in connection with the manufacture of inks under the formula of Exhibit Nichols-H applicable to the manufacture of ink under the formulae set forth on Exhibit Nichols I? A. Yes, sir.

Q112. Did you make those inks yourself? A. Yes, sir.

Q113. In the making of these inks, Mr. Nichols, do I correctly understand that what you did was to collect all ingredients, which are set forth in the formula, and put them together? A. That is right.

Q114. How did you do that? A. We followed our regular method of manufacture.

Q115. I mean how did you put them together? A. We take a formula and a mixing pan, and circulate around the plant, stopping at each drum of the particular color that is called for in the formula, and weigh out the designated amount that (648) is in the formula, and in that way we make a batch of ink.

Q116. Well, you spoke of using a pan. Do I understand that you put all the materials in the pan and mix them up in some way? A. They are mixed in a mixing pan, yes.

Q117. Is that what you, yourself, did? A. That is what I did; yes, sir.

Q118. In connection with these inks? A. Yes, sir.

Q119. I note in connection with Exhibit Nichols I that the date of March 10, 1932, appears on all three formulae, about which you have testified, on that page. What does that date signify? A. That is the date that the ink was made.

Q120. Is that also regular practice in your plant? A. That is a regular practice.

Q121. By that I mean it is your practice to enter a formula in your formula book and date it as of the time that the formula was produced? A. That is correct.

Q122. Suppose that you later have occasion to produce more of the same ink, what then happens? A. We refer back to this formula.

Q123. You refer back to the original formula? A. That is correct.

Q124. I will have to ask you for the record whether or not your testimony concerning the date would apply also (649) to the date of February 26, 1932, appearing on formula No. S 58929 as S-58850, of Defendant's Nichols Exhibit H? A. Yes.

Q125. That then would be the date on which you first made a Jirousek ink entitled or called "Perspective H T Black" under the particular formula which is shown on that exhibit? A. That is right; yes, sir.

Q126. Had you made any such inks previous to that time? A. Simply experimental batches of which no formula was recorded.

Q127. You have testified that this ink was made for sale. Do I understand your testimony to be then that the date of the first manufacture of this particular ink, according to the particular formula just referred to, was February 26, 1932? A. Yes, sir.

(650) Mr. Free: Now at page 71, your Honor, Q128 that is the first question after the excluded portion.

The Court: All right.

By Mr. Free:

Q128. I hand you a paper marked for identification as Defendant's Exhibit Theuer F and ask you whether you know what that is. A. This is a piece of advertising matter that we got out with reference to this perspective half tone black.

Q129. When you say "we" whom do you mean? A. The Charles Eneu Johnson Company.

Q130. How did you use that piece of advertising matter?

Mr. Watson: I object to that unless it is within the personal knowledge of this witness. He has not shown that he had anything to do with advertising or sales.

The Court: The objection is good.

By Mr. Free:

Q131. Go ahead. A. In the same manner as any other piece of advertising would be used.

Q132. Well, do you know how it was used, Mr. Nichols? A. Yes. It was distributed——

Mr. Watson: I think that my objection that he does not have personal knowledge of this is good. It is obviously hearsay.

(651) The Court: The objection is sustained.

By Mr. Free:

Q136. Do you know whether or not it was the practice to include that folder in shipments of ink? A. Yes; I believe we did.

Q137. Did you see that done? A. Yes; I would say that I did.

The Court: That is admissible.

Mr. Free: Now, I think it is fair to offer this circular, because that is what he is talking about, Q-1. He identified it personally as having been one of those which was in the shipments which were sent out to the customer.

Mr. Watson: I object to it as entirely immaterial.

The Court: The objection is sustained, advertising matter has no probative value in a situation like this.

Mr. Free: I would like to offer under the same rule the testimony on pages 72 and 73, excluding Q136 and Q137, which were admitted, and then I would like to offer 138 through 141, under the rule.

The Court: You do not have to have permission to do that, do you?

Mr. Free: I would also like (652) to offer this circular in evidence which is now marked Q-1 for identification, under the rule 43(c).

The Court: All right.

The offer of proof under Rule 43(c) is as follows:

Q132. Well, do you know how it was used, Mr. Nichols? A. Yes. It was distributed by salesmen and by direct mail.

Q133. Did you, yourself, ever see any of them going out by direct mail? A. I don't remember.

Q134. Have you ever seen that thing before? A. Yes.

Q135. When, if you recall, did you first see one of those printed pieces? A. Some time shortly after the time that this came out—the date of that I have forgotten—or about that time.

Offer of Proof.

Q138. To what ink does this folder refer? A. It refers to perspective half tone black.

Q139. Do you know whether or not that was, or was not, the same perspective half tone black as is set forth in the formula, about which you have testified, of Defendant's Exhibit Nichols H? A. This folder refers to the perspective black that we manufacture.

Q140. Did you write this circular? A. No.

Q141. I would like to ask you whether or not that perspective half tone black of the formula of Defendant's (653) Exhibit Nichols H was, or was not, the perspective half tone black which the Charles Eneu Johnson Company at that time manufactured, and the purpose of my question is to ask you whether or not this formula is what they made and sold for black ink of that particular kind or whether or not they made several black inks of that kind? A. That is the black ink that we made of that kind.

Mr. Watson: All of the cross examination of that witness relates to statements which were stricken out in accordance with the ruling, and therefore I am not offering any part of that.

The Court: All right.

Mr. Free: I offer Q209 and its answer on page 82 under 43(c). That is still re-direct examination on page 82.

Mr. Watson: That is objected to as relating to the formula which is not in evidence.

The Court: The objection is sustained, and then it can go in as an offer of proof before objection.

Mr. Free: I offered it before the objection, so (654) I do not think the objection means anything.

The Court: You cannot make an objection until you have offered something.

Mr. Free: I offered it under 43(c), and then you objected to it.

Mr. Watson: I should like a suggestion from your Honor as to the procedure to be followed with respect

to Mr. Free's making these offers of proof with respect to which the cross examination relates. I believe that such an offer should tell the complete story, don't you?

The Court: It is right here.

Mr. Watson: It is rather a peculiar situation, I mean, to get a complete story. Suppose this offer of proof goes in and then later it should be held that the testimony is admissible?

The Court: That is for the Court of Appeals, that is all. The offer of proof is made so that, if I decide erroneously, they will have the evidence before them in the record.

Mr. Byerly: I think in making these offers, he should include the cross examination, I mean, if the Court of Appeals should want to consider it that should be included with the offer—we are not offering it—to make a fair statement for the Court of Appeals. If he thinks they will consider the matter he certainly (655) ought to include the cross examination.

The Court: You can offer the cross examination.

Mr. Free: I am not going to offer it.

Mr. Byerly: You offered it under this Rule 43(c).

The Court: He does not have to offer anything he does not want to. You can offer it on condition that it is subject to the ruling of the Appellate Court on his offer.

Mr. Byerly: We will do that.

Mr. Watson: All the cross examination goes in subject to the ruling under the offer of proof, that is, if the proof which has been offered is found acceptable under that condition the cross examination is considered in. Copy all the cross-examination.

The Court: Copy it right in with the offer of proof, the offer of cross-examination. It is material to that.

Offer of Proof.

The offer of proof referred to is as follows:

Cross examination of Lewis E. Nichols.

By Mr. Byerly:

Q142. Your job was that of ink maker in 1932, was it? A. Yes, sir.

Q143. Did you have anything to do with the sale of inks made by you? A. No, sir.

Q.144. Did the company keep records of all its sales, (656) as far as you know? A. Yes, sir.

Q145. You didn't have charge of those records? A. No, sir.

Q146. Did you have charge of these formulae records? A. Yes, sir.

Q147. Did you make up these formulae yourself? A. I did not type them. The original formulae were made out by me and then they were typed into our permanent records.

Q148. You have no knowledge whatever of the composition of these substances which you have called base inks, as I understand you? A. I wouldn't say that I didn't have any knowledge of them because upon that is where I base my skill as an ink maker because of the fact that I do have certain general knowledge of the compositions of these inks.

Q149. You gained that knowledge from mixing them and not from making them though? A. Well, let me amend my answer by saying that I was originally employed at the factory of the Charles Eneu Johnson Company as an ink maker, starting in 1914, and I came to Cleveland in 1919, and then during those years that I was at the factory I did have a general knowledge of basic formulas used to manufacture inks.

(657) Q150. Could you tell without examining the records at Philadelphia whether or not the materials sent out under these numbers here were ever changed in any way?

A. No; not entirely. Let me amend my answer by saying that as we received those base colors from Philadelphia we checked them so that we could maintain a certain standard. If there had been a noticeable change in them we would have noticed it at our Cleveland branch.

Q151. Do you mean that you analyzed them? A. No; we did not analyze them. We just made a physical check.

Q152. Do you mean that you would have noticed a change in the consistency? A. Yes, sir.

Q153. Sometimes you did notice changes? A. Sometimes there were changes in consistency or in the density, or in the strength, of the color. We did that so that we knew that we were working from standard base colors and could supply our customers with a uniform product.

Q154. You did that to check up on what they were doing in Philadelphia? A. That is right.

Q155. Did you check up Mr. Jirousek in any way to see that the composition of his materials didn't change? A. No, sir.

Q156. They were simply handed to you by him? A. That is right.

Q157. You made no analysis to see what they were? (658) A. No.

Q158. You have no personal knowledge as to what he gave you or whether that he gave you one day was the same as what he gave you the next? A. That is correct., I left it up to Mr. Jirousek to see that the material he supplied me was up to a certain standard.

Q159. But you didn't test that material? A. Not personally.

Q160. Was there anybody in the branch there helping you mix these things? A. Our regular employees were around there when this was being done.

Q161. Did you do all the work physically or did some of your help do part of it? A. Well, when it was a question

of making up, for instance, this batch of 72 pounds and the batch of ink and the container would run around 100 or 115 pounds it was necessary for me to get help to lift that weight. That is all the aid I had in the physical end of it.

Q162. You didn't have anyone aid you in making these things together? A. No, sir.

Q163. Did you put the ingredients into an ink mill or just mix them in a pan? A. We mixed them in my mixer.

Q164. Is that some kind of machine? A. We had a regular ink mixer in which the materials were mixed.

(659) Q165. You ran that all yourself in those days? A. Yes, sir.

Q166. Were there any other employees in the ink mixing department that knew what you were doing? A. Yes, sir.

Q167. Who were they? A. Oh, I couldn't tell you that without referring to our employment records. Just who the employees were at that particular time I don't remember.

Q168. Do you have any knowledge of any of them? A. No; not a definite recollection now.

Q169. Was Mr. Jirousek employed by your company? A. No, sir.

Q170. This formula No. S 58929 does not contain the name of any customer, does it? A. No, sir.

Q171. You say that amounted to 72 pounds of ink? A. Yes, sir.

Q172. What proportion of that was material supplied by Mr. Jirousek? A. By referring to the formula, three pounds of "C. C. S." and twelve pounds of "black." That was for this particular formula, S 58929.

Q173. That is, he supplied fifteen pounds out of 72? A. That is correct.

Q174. And the rest of it was just standard ink? A. Yes, sir.

(660) Mr. Yungblut: I think he is in error there.

A. Excuse me. It should be twelve pounds of C. C. S.

Mr. Yungblut: Six pounds of black.

A. Eighteen pounds. That is right.

Q175. Then it was eighteen pounds out of 72? A. That is correct.

Q176. Now, take the first item, 33 pounds of black ink, was that an ink that you could print with just as it was? A. It could be used on a lithographic press.

Q177. Was some of it sold just that way? A. I don't know.

Q178. How about these other inks referred to, could they be used just as they came to you? By "these other inks" I am referring to those of this formula. A. No, sir.

Q179. What was the trouble with them? A. Blue ink, No. C 3841 D, would not print on a letter press without the addition of a varnish. The purple ink, No. P 8848, could not be used on a letter press without the addition of drier. That same statement also applies to bronzine No. F 2532.

Q180. What sort of varnish did you put into that blue ink when you sold it ordinarily? A. A linseed varnish.

Q181. Didn't these materials, as they came to you, contain linseed oil? A. Yes, sir.

(661) Q182. Is this cobalt drier a liquid or a solid? A. It is a liquid.

Q183. You don't know its composition, I suppose? A. I am supposed to know, but I wouldn't say definitely; no.

Q184. It is supposed to make linseed oil oxidize more quickly, isn't it? A. That is correct; yes, sir.

Q185. These three colored inks, that you have referred to, referring to Exhibit Nichols I, were three five-pound batches, weren't they? A. That is correct. I would like to amend that. The yellow was five and a quarter, the red was five and a quarter, and the blue was five pounds. I don't know whether that is important, or not.

Q186. Well, take the yellow, for instance, five and a quarter pounds, how much of that came from Mr. Jirousek? A. Let's get this one right. Twelve ounces.

Q187. Now, take the red. Out of the total of five and a quarter pounds, how much did Mr. Jirousek furnish? A. Twelve ounces.

Q188. Now, is your answer the same with regard to the process blue? A. There were twelve ounces of the blue.

Q189. That is, twelve ounces out of five pounds? A. Yes, sir.

(662) Q190. Is this circular, Exhibit Theuer F, something that Mr. Jirousek wrote? A. I don't know.

Q191. It is a good deal like his line of talk, isn't it? A. I wouldn't say.

Q192. Then you don't know who wrote it? A. No; I do not.

Q193. On Exhibit Nichols H who wrote in the figure 5 in pencil in the first item of the formula? Do you know? A. I don't know.

Q194. When you made up another batch of any one of your formulas was any record of that made anywhere? A. Yes, sir.

Q195. If there was a change in the formula in later batches, was that recorded somewhere? A. Yes, sir.

Q196. Have you examined the records to see whether or not this perspective black formula was changed? A. No, sir.

Q197. How long is it since you made up a batch of this formula S 58929? A. This batch of S 58929 was made up on the 26th of February, 1932, according to the records.

Q198. Is that the last batch that you ever made? A. No, sir.

Q199. When did you make the last batch? A. I cannot say definitely without referring to our records.

Q200. It was quite a while ago, wasn't it? A. Yes, sir.

(663) Q201. Did you ever make up more than one batch of any of the three formulas of Exhibit Nichols I? A. I don't know.

Q202. Do you know whether or not Mr. Shearer wrote this circular? A. I don't know that.

Q203. You know Mr. Shearer, don't you? A. Yes, sir.

Q204. Was he employed by the Johnson Company at the time that you were? A. Yes, sir.

Q205. What was his job? A. He was the Cleveland Branch Manager.

Q206. He was your boss, wasn't he? A. He was my boss; yes, sir.

Q207. How long did he stay with the company? A. He left in May, 1932.

Q208. You don't remember the names of any of the employees of the company who had any knowledge of your work in mixing these inks? A. Not without referring to our records at that time.

Re-direct examination of Lewis E. Nichols by Mr. Yunglblut:

Q209. Mr. Nichols; on the formula, about which you have been testifying, of Exhibit Nichols H, I notice the word "stock" on the line marked "for". Could you tell me what that means? A. Yes. In this particular instance we made up a batch of 72 pounds and packaged it, and then (664) placed it in our stock with the idea of selling it, either all of it or part of it, as the occasion arose.

Deposition read in evidence of Clayton H. Benjamin produced as a witness for defendant, who, being first duly sworn, deposed and said:

Direct examination by Mr. Exec:

Q1. Mr. Benjamin, will you state your age, please? A. Sixty-four.

Q2. What is your full name? A. Clayton H. Benjamin.

Q3. Your residence, Mr. Benjamin? A. 3710 Maplecrest Avenue, Parma, Ohio.

Q4. Where are you now employed, Mr. Benjamin? A. Charles Eneu Johnson & Company.

Q5. In what capacity? A. Manager of the branch.

Q6. What branch is that? A. Cleveland branch.

Q7. Where is the office of that branch located? A. East 21st and Superior.

Q8. For how long have you been with the Charles Eneu Johnson & Company? A. It is between 30 and 40 years.

Q9. How long have you been Manager of the Cleveland branch? A. Ten years.

Q10. Before you were Manager of the Cleveland branch office what were you doing? A. Salesman.

Q11. For the Charles Eneu Johnson Company? A. Yes, sir.

Q12. And what was its business? A. Manufacturing of (665) printing and lithographic inks.

Q13. And are those the substances you sold or sell? A. Yes, sir.

Q14. In the course of your selling work did you contact printers and users of inks? A. Yes, sir.

Q15. Did the Charles Eneu Johnson Company at any time manufacture and sell an ink called perspective half tone black? A. Yes, sir.

Q15a. Mr. Benjamin, did you ever sell any perspective half tone black ink for the Charles Eneu Johnson Company? A. Yes, sir.

Q16. What kind of ink was it?

Mr. Watson. I object to that urless the witness has personal knowledge of the composition of the ink.

Mr. Free: He is talking about the physical characteristics of it here.

Mr. Watson: I believe the answer is meaningless, unless we have something with respect to the composition of this material.

The Court: He knows it as a quick-acting ink. Would not that identify it as a particular class or type of ink?

Mr. Free: Yes.

Mr. Watson: Unless we have something saying what it was made of. The fact that it was a quick-acting (666) ink, so-called, is absolutely meaningless. It does not get us any forwarder.

Mr. Free: We have here a lot of testimony in the prima facie case of printers talking about the characteristics of ink. They knew nothing at all about the composition, and that is all this testimony has to do with it. He can say, I think, that the ink was thus and so when it was printed, namely, it was a quick-drying ink.

The Court: Quick-drying ink I suppose in the trade is a particular type of ink that people engaged in that business would know about and would not know the details of it, just like I might know a Ford car and would not know how to make one.

Mr. Watson: That is true.

The Court: The objection is overruled.

By Mr. Free:

Q17. Go ahead and answer the question. A. It was known as a quick setting ink.

Q18. What does that mean? A. It sets very quickly, but it wasn't dry. It just sets.

Q19. When did you, yourself, begin to sell perspective half tone black ink, as you recall? A. As nearly as I can recall it, it was in March, 1932.

Q20. Did you sell any of it? A. Yes, sir.

(667) Q21. Did you have occasion to see it being used by customers who had bought it from you? A. Yes, sir.

Q22. Can you give us an example of a time when you saw it being used and tell us what sort of use it was being put to? A. It was being used on half tone work.

Q23. By whom, for example? Do you have a particular customer in mind? A. A. L. Garber Company of Ashland was one.

Q24. Is that Ashland, Ohio? A. That is right.

Q25. Is that a printing establishment? A. Yes, sir.

Q26. Did you see perspective half tone black ink which you had sold them being used in that plant? A. Yes, sir.

Q27. Can you tell us a little something about that use and how they were using it, and what was happening? A. I don't know as I quite understand your question. It was used on half tone work. I don't recollect what the work was. I know I made a trip down there just to see it work.

Q28. They were using it on a printing press, were they? A. Yes.

Q29. And did you note anything concerning its drying characteristics as used on that press?

Q30. Go ahead and answer, please. A. It set very rapidly.

(668) Q31. Well, just in an effort to get you to tell us something about what you observed there, I will ask you: How do you know that it set very rapidly? A. Well, they would print a sheet on one side and turn it over, I would say, within twenty minutes, and print on the other side of it and not scratch the first side that was printed. It wasn't dry, but it set so that it wouldn't rub the printing. You could smear it if you rubbed it, you understand.

Q32. Do I understand from your testimony that when a sheet had been run through the press and was printed you could then rub it and if— A. Well, if you rubbed it hard enough you could cause a smear, but if it was handled right you could not. I don't know just how to explain it. You can see the ink flattened out on the sheet, but there is no moisture left on the surface.

Q33. Did it, or not, have a tendency to offset on the other sheets? A. No; it didn't.

Q34. You saw that in action, did you, at the Garber Company plant? A. Yes, sir.

Q35. Were they at that time running what is sometimes called a turn over job? A. Oh, yes. Almost all jobs are printed on both sides. I think it was tried out; in fact, I know that it was tried out that way to see what it would do. I don't recollect what job it was now.

(669) Q36. Do you recollect whether or not in passing through the press the second time it offset, or not, on the tympan or make ready? A. As far as I know, it didn't.

Q37. I take it from your testimony that you made a sale of that ink to the Garber Company in Ashland, Ohio? A. Yes, sir.

Q38. Have you any record of that sale? A. Yes, sir.

Q39. Have you it with you? A. No, sir.

Q40. Is such a record available? A. We have the record in the office yes.

Q41. Do you have with you any records of any of your sales? A. No, sir.

Q42. You didn't bring those? A. No, sir.

Q43. In connection with your selling of perspective half tone black ink was any printed matter or advertising matter employed by you? A. Yes.

Q44. I hand you a paper which is marked Defendant's Exhibit Theuer F and ask you if you know what that is? A. Yes, sir.

Mr. Watson: I think that your exclusion of the advertising matter also excludes this testimony with respect to it. You have previously excluded the other testimony about that. I think the same ruling applies to this.

(670) The Court: There is no objection, is there?

Mr. Free: No, there is no objection. There has been a general objection.

The Court: I have admitted that, have I (referring to circular)?

Mr. Free: No, but this is another man who knows about it.

The Court: What is the probative value of advertising matter? It is just self-serving and boosting and not supposed to be a careful statement of fact.

Mr. Free: It describes this ink back in 1932 when this was printed, and to that extent it does show us what this ink was and is not self-serving, if your Honor pleases, because we did not make the statement, the defendant did not make the statement.

Mr. Watson: If that is the case the author of the circular should have been produced for cross examination.

The Court: The objection is sustained.

Mr. Free: I think I will offer it a little differently, in this way, as merely an illustration of the ink which was printed on this paper, without offering the context of the circular. It is the ink itself.

The Court: That is another way of beating the (671) devil around the bush.

Mr. Watson: I think that is all it could be. Until we have some proof as to the composition of the ink I think it is entirely immaterial.

The Court: The objection is sustained.

The offer of proof under Rule 43(c) is as follows:

Q44. I hand you a paper which is marked Defendant's Exhibit Q-1 under Rule 43(c) and ask you if you know what that is? A. Yes, sir.

Q45. What is it? A. That is a perspective blac-

Q46. Well, is that such a piece of advertising as you referred to in your former answer? A. Yes, sir.

Q47. Did you ever use it? A. Yes, sir.

Q48. What use did you make of it? A. I gave it to my customers.

Q49. And when was that, approximately, if you recall? A. It was in March, but we might have had some in late (673) February. I wouldn't be positive about it. It was in March, I know.

Q50. In what year, Mr. Benjamin? A. 1932.

Q51. Have you any idea about how much of this ink was sold by yourself? A. No, sir.

Q52. Do you know whether or not this ink in 1932 was sold regularly by the Charles Eneu Johnson Company? A. Yes, sir.

Q53. You were not then the only salesman selling it? A. No, sir.

Q54. As to the matter of satisfaction or lack of it by your customers with that ink, what would you say? A. I would say that in general it was satisfactory.

(672) Q55. Do you have any way of knowing that? A. Not except the sales that were made.

Q56. Were, or not, some of those sales reorders? A. Oh, yes.

Q57. Are such sales records, as I have referred to, available? A. Well, they are in the customers' files. I would have to get permission from Mr. Harkness.

Q58. Do you mean to produce them? A. Yes, sir. I don't feel free to produce them without his permission. We have them there.

Q59. Those customers' files are the regular files of your company, are they? A. Yes, sir.

Direct examination resumed by Mr. Free:

Q60. Do you happen to know whether or not a sales record exists of the sales which you made to the Garber Company, which you have mentioned? A. I beg your pardon.

Q61. I say, do you happen to know whether or not there is a sales record anywhere of the sales made to the Garber Company, that you have mentioned? A. Oh, yes; there is.

Q62. You have that sales record, do you not? A. Yes, sir.

Q63. At your office? A. Yes, sir. We have that and several others.

Q64. As to the composition of the perspective half tone black ink which you sold, as you have stated, were you familiar with the composition of it? A. No, sir.

Q65. You didn't know about it? A. No, sir.

Q66. Did you, yourself, sell any perspective colors other than black at that time, do you recall? A. No; I don't think so.

Q67. Your sales then were confined to the black? A. Yes, sir.

(674) Q68. Was the Johnson Company at that time manufacturing any other quick setting inks, as you call them? A. Any other one?

Q69. Yes. A. No.

Mr. Watson: There was an objection here to strike out all the testimony of the witness claimed to be based on records that were not produced.

The Court: I have been following that. I do not think he testified to anything that was not based on the record.

Mr. Watson: Later on he did produce records of his sales. I was just wondering what the objection was made at that time. Perhaps Mr. Free would like to turn over to the subsequent testimony.

The Court: Before you go on with the cross?

Mr. Watson: Yes.

Mr. Free: On page 133 he has been put back on the stand after he got the records.

The Court: Each item ought to be headed Evidence to which objection was sustained by the Court but offered under Rule 43(c).

By Mr. Free:

Q90. I asked you, Mr. Benjamin, to look through your records and pick out some records of sales of perspective half tone black made by you, and you have done so, I take (675) it? A. Yes, sir.

Q91. Will you please produce those records? A. There is one for The Commercial Printing & Lithograph Company. Perhaps I should start with the first sale. There are 50 pounds, ten fives, perspective half tone black, No. S 58,850, one dollar per pound, $50.

Q92. Just a moment, Mr. Benjamin. You have produced two book-like folders here and I would like to ask you what they are. A. They are files in which we keep individual customer's sales.

Q93. Each of these book-like folders is a file for an individual customer, is it? A. That is right.

Q94. These are the regular files of your company? A. Those are our regular files, yes.

Q95. Where did you get them? A. From our file cases which are made up as the orders come in.

Q96. And did you get them just this afternoon? A. Yes, sir.

Q97. What designation does this sheet have, Mr. Benjamin? A. AA 8088.

Q98. Does your name appear on that page, Mr. Benjamin? A. It does.

Q99. What does that indicate? A. I made the sale or I got credit for the sale whether I made it, or not.

Q100. Do you think you made it, or not? A. Yes, sir.

(676) Q101. You made that sale personally? A. Yes.

Q102. You called attention to another paper. What was it? A. That was a reorder from the first one.

I offer in evidence as Defendant's Exhibits S-1 and T-1 of the Commercial Printing & Litho Company order and reorder identified by the witness, of the ink which he has sold under this name "perspective half tone black."

(Marked Defendant's Exhibits S-1 and T-1.)

Mr. Free: (Continuing)

Q103. What does that represent, Mr. Benjamin? A. A sale of 20 fives or 100 pounds, perspective half tone black, S 58,850.

Q104. Did you also make that sale? A. Yes, sir.

Q105. Does your name appear on the paper? A. Yes, sir.

Q106. The first sale, as evidenced by Exhibit S-1, when was that made? A. March 8, 1932. That is the date that it was billed. The sale was made a day or two prior to that.

Q107. That is, a day or two prior to March 8, 1932? A. Yes.

Q108. What would you say as to Exhibit T-1? A. The same would be true of this.

Q109. What is the date of the bill?

Q110. What year? A. 1932.

(677) Q111. And the date is so marked on it? A. Yes, sir.

Q112. Do you testify that you made both of these sales to this one company? A. Yes, sir.

Q113. And that the material noted on the exhibits as Perspective H T Black is the Jirousek ink of which you spoke in your former testimony? A. Yes, sir.

Q114. Turn to the second booklet. For what company is that folder? A. The A. L. Garber Company, Ashland, Ohio.

Q115. You have called my attention to a paper therein. What does that paper represent? A. A sale of perspective half tone black.

Q116. To whom? A. The A. L. Garber Company.

Q117. Who made that sale? A. I am not positive whether Mr. Hill or I made it. It was in Mr. Hill's territory and his name appears on the sheet.

Q118. Is the A. L. Garber Company noted on this paper the same A. L. Garber Company that you testified about in your former appearance here? A. Yes, sir.

Mr. Free: I offer as Defendant's Exhibit U-1 the sales slip of the A. L. Garber Company, dated March 2, 1932.

(Marked Defendant's Exhibit U-1.)

Cross examination by Mr. Watson:

Q70. Your company sold a lot of other kinds of inks besides this perspective black; is that correct? A. Yes, sir.

Q71. And were any of those other inks satisfactory to your customers? A. I believe they were.

Q72. This is just one of a great many items that you were selling at that time, isn't it? A. Yes, sir.

* * * * * *

Q78. Did you actually gauge the length of time between printing one side and backing up or printing on the other side? A. I didn't understand that question. Will you ask it again?

Q79. That is, at Garber's? A. I think so; yes, sir.

Q80. You actually timed it? A. I don't think that I timed it with my watch, no.

Q81. You don't think you did, do you? A. Mr. Shearer was with me that day and he was handling the situation.

Q82. You really don't know how long it was before they (679) backed them up? A. In that particular job, no.

Q83. Is your company still selling this perspective half tone ink? A. We are selling a perspective half tone ink, yes.

Q84. The same formula as the other? A. I don't know.

Q85. You have nothing to do with the formulas, do you? A. No, sir.

Q86. Does your company sell any quick drying inks for use on rotary web presses? A. I believe they do; yes, sir.

Q87. How long have you been doing that? A. Oh, a number of years.

Q88. Three or four years? A. Yes; I would say so.

* * * * * * *

Q120. You, yourself, have no knowledge of the composition of this ink referred to in these several statements, have you? A. No, sir.

Re-direct examination by Mr. Free:

Q121. Mr. Benjamin, are the sales represented by these papers, Exhibits S-1, T-1, and U-1, respectively, the only sales of perspectiv half tone black ink of which you have knowledge? A. No, sir.

(680) Q122. Are these just representative ones which you have picked out at my request? A. Yes, sir.

Deposition read in evidence of FRANK PELLINGER produced as a witness for defendant, who, being first duly sworn, deposed and said:

Direct examination by Mr. Free:

Q1. Will you please state your name, age and residence? A. Frank Pellinger; 35 years; 4223 West 56th Street, Cleveland, Ohio.

Q2. Mr. Pellinger, by whom are you now employed? A. Tower Press.

Q3. And how long have you worked for the Tower Press? A. It will be eight years.

Q4. And before that time by whom were you employed? A. With the Evangelical Press.

Q5. And the Tower Press is a sort of successor to the Evangelical, is it? A. Yes.

Q6. Evangelical was located in the same place? A. Yes.

Q7. And that place is where? A. 1,900 Superior Avenue.

Q8. You are a pressman, are you not? A. Yes, sir.

Q9. And you have continuously been a pressman throughout the period of your employment both by Evangelical and Tower? A. I started with Evangelical and served my apprenticeship with Evangelical, and I worked (681) into a pressman.

Q10. How long did you work for Evangelical or from what date, if you can remember? A. I believe it was about 1922 or '23; somewhere about there, I believe.

Q11. That you came with the Evangelical Press? A. I think it was that time.

Q12. How soon after that did you become a pressman? A. That is kind of hard to say because they used me as a helper and a pressman when they were rushed. Of course, I think that I actually became a pressman when we went over into the new building and I think I started as a press-

man at Tower Press; that is, that is when I started actually to be a pressman there.

Q13. Did you know, or do you know, a Mr. Joseph F. Jirousek? A. Yes, sir.

Q14. Who is he? A. He was our shop superintendent in the press room or the shop foreman in the press room.

Q15. At Evangelical or Tower? A. At Evangelical.

Q16. When did he come with Evangelical, if you know? A. I believe it was around 1932 or '31 possibly. Either 1931 or '32; something like that, he started in there. I don't remember exactly the dates.

Q17. At that time were you running a press at Evangelical? A. I was running a press with a pressman over me; that is, I would run the press and he would see (682) that I done everything right so that I could go ahead and run the job off.

Q18. And then you would finish the run? A. Well, I got so that I could manage the press by myself without his help, but still I was under him as his helper yet.

Q19. Do you remember whether or not the Evangelical Press printed a magazine called Metal Progress? A. Yes.

Q20. Did they start the printing of that magazine after you were there? A. Yes; after I was there.

Q21. And do you know whether or not they have continued to print it up to date? A. They have.

Q22. When does that magazine come out? A. It comes out once a month. It is a monthly magazine.

Q23. Has that been true throughout its history? A. Yes; that was true when they started and it has been run every month since, to my knowledge.

Q24. And at what time would the actual printing be done, oh, let us say, of the December issue of Metal Progress? A. That is a little bit hard to say for the simple reason that it varies. It depends upon what we can

get together. It should be out on the 5th of the month, but it varies. Now, for instance, this month, we are just about ready to run it through. The last form is on the press now. We are just finishing up the last form of the December issue of Metal Progress.

(683) Q25. Today, did you say? A. Yes.

Q26. So that you don't always get it out on a certain day? A. I cannot specify any certain time because it comes in at various times. I can tell you that sometimes we run the cover before they have any of the inside ready and lots of times they run the cover after the inside is all finished. They are waiting for the cover.

Q27. When you say that it comes to you at various times I suppose you are referring to the copy of the magazine? A. When we get our final O.K.

Q28. How long does it take you to print the average issue of Metal Progress? A. That is something else that is very hard to answer.

(684) Q29. That varies also? A. That varies also because sometimes they get a couple of forms and then we have to wait a couple of days before they get another one. It is hard to say.

Q30. Is it something that can all be done in one day? A. No.

Q31. I hand you a magazine, Mr. Pellinger, which has been marked Defendant's Exhibit O-1 and ask you if you know what that is? A. Yes; that is the cover of Metal Progress.

Q32. Well, is it one of the covers or is it the whole thing? A. Well, it is the whole book.

Q33. Does that book bear a date? A. Yes. September, 1931.

Q34. Do you recognize that as anything which you printed? A. Yes; this is very familiar to me.

Q35. Do you recall the printing of that particular issue? A. Yes.

Q36. When would you say that the cover of that issue, let us say, was printed? A. Well, it might have been printed the first part of September or it might have been printed the latter part of the previous month.

Q37. In what year? A. 1931.

Q38. But it would have been in that range of time? A. Yes.

(685) Q39. I will ask you to examine that cover and state if you recall any circumstances connected with the printing of it? A. Well, now, what do you mean by that? Do you mean as far as the running of the cover is concerned?

Q40. Yes. A. Well, would you kindly tell me what you really mean, what you want me to answer?

Q41. I will rephrase the question, Mr. Pellinger. How many colors are there on that cover? A. Three colors.

Q42. Can you tell by looking at that cover or from your own recollection the order in which those colors were printed? A. The silver was run first.

Q43. And then what? A. I would say that the black was run next and then the orange.

Q44. Are you testifying now from an examination of that cover or do you recall that that is what you did in printing that magazine? A. Well, I can swear to it that the silver was run first, but I don't know for sure whether the black or the orange was run next. Wait a second. By looking at the back I can tell that the black was run and then the orange was run, but I know for a fact that the silver was run first.

Q45. I take it from your testimony that that is a cover which you, yourself, printed? A. Yes.

Q46. Do you recall doing so? A. Yes.

Q47. Were you at that time a pressman or a pressman's (686) helper? Do you know now? A. I would say that I was both. I was helper and pressman on it.

Q48. Did you have any difficulty in printing that cover? A. I think that as far as my memory serves me right, we had a little trouble with this silver on here.

Q49. What were you using then in the way of silver, if you know? A. I believe at that time we were mixing our own formula. What I mean by "formula" is that we had the silver powder and the varnish, and we mixed the two of them together.

Q50. And did you do that or was it done? A. It was done; yes.

Q51. The material was furnished to you and you said that you had some trouble with it? A. Yes.

Q52. What kind of trouble was that? A. I believe we had trouble with this rubbing off here because it wouldn't dry thoroughly; that is, the silver would flake up here and we would have the silver drying after being printed, and it was so hard that the black wouldn't take on it. It wouldn't be a solid enough black on the cover.

Q53. Did you overcome that difficulty? A. Yes, after mixing it differently; that is, after Joe Jirousek had fixed up some ink that he had mixed up, and he finally got it down to where we wanted it, so that it would dry all right.

(687) Q54. Well, then, if I understand your testimony, you were having difficulty with the cover until Mr. Jirousek fixed you up some ink? A. Yes, sir.

Q55. What ink did he fix up? That is, which color or colors? A. He fixed up the black; that is, the silver, to start off with. Then he worked up something on the black so that it would take this silver a little better.

Q56. If I understand your testimony, he fixed up such an ink and brought it to you to use, did he? A. Yes.

Q57. And did you use it? A. Yes, sir; I used it.

Q58. And did that correct the trouble that you were having? A. Yes; it seemed to work very satisfactorily.

Q59. Can you tell us something about how it worked, Mr. Pellinger? A. It seemed that it worked a little bit better than what we had before and it seemed that we could handle it a little sooner than if we used the other stuff. If we didn't handle it soon enough, then it would dry too fast. That is, with the other ink. With this ink Jirousek had mixed up it seemed that we could run right away on it.

Q60. And by running right away do I understand you to mean that— A. We could follow the black right up with the silver.

Q61. That is, in a second printing operation? A. Yes.

Q62. What about the drying of that ink? Did it dry (688) more slowly or more rapidly, as you recall it? A. It seemed that it dried a little more rapidly on the paper. It seemed to dry more rapidly.

Q63. In what way were you running those covers? Will you describe that to me? That is, as a printing job, what kind of job was it? What press did you use? A. We used what we call a No. 4 swing back feeder on a small press which was just about the right size for a job like this, for this kind of cover to run on.

Q64. You are talking about the particular cover on the September, 1931, issue of Metal Progress, aren't you? A. Yes.

Q65. This was a swing back press? A. Swing back feeder; that is right.

Q66. What sort of press was that? Was it a rotary press? A. No; it was what we call a regular cylinder press, flat bed.

Q67. How did you run that cover? What part of it did you print on each side of the sheet or on any one side of the sheet? A. Well, we ran the silver on one side and then the black.

Q68. The cover has four pages, has it not? A. Well, as it is finished.

Q69. Which of those four pages would you print at the same time on any one side of the sheet? A. We print all four (689) pages on one side of the sheet.

Q70. Then what do you do with the sheet after that? A. Turn the sheet over and run the same four pages again.

Q71. Did you use any heat or flame on your press? A. Why, yes; we used a good deal higher flame or hotter fire on it than we did on the previous jobs; that is, we would turn our gas up higher.

Q72. How many of those covers do you recall running, if you do recall, Mr. Pellinger? A. I think that we ran somewhere in the neighborhood of 8,000. I think it was about 8,000 or something like that; perhaps eight or nine thousand; I don't recall offhand.

Q73. Would that be covers or only— A. It would be the whole book.

Q74. You would print more than 8,000 books? A. More than 8,000 books; yes.

Q75. And that would mean how many printings of the cover? A. Well, that would mean 4,000 sheets for 8,000 copies.

Q76. When you had run the 4,000 sheets through your press the first time what did you then do? A. Well, we ran, say, about 2,000 of the silver, took them over and ran them on the black, let the silver keep running on that one side there until they finished up on one side of the 4,000, brought them all over to the black and ran them through on the black, (690) turned the sheets over in order to back with the silver again, run your silver through and work it back on to the black.

Q77. When you speak of taking it over do you mean taking it over to another press? A. That is right.

Q78. And was there any waiting between running off the first two thousand and the running of the second two thousand? A. No; there wasn't a very long wait. By the time

we got the first two thousand off the black the silver from the other press would be dry enough so that you could put it in and run it through on the black.

Q79. Then, if I understand your testimony correctly, what you did was to run these sheets through a press that was set up to print the silver? A. Yes.

Q80. And when two thousand of them had passed through that press you right away took those two thousand over, as you call it, to a second press which printed the black, and you ran them through that press? A. Yes.

Q81. Something has been said here about offsetting. Did you have any offset trouble? A. We did for the first, say, one hundred sheets or so until we got the color down to where we wanted it, and after we got it down to where we wanted it, then it worked all right for us. Then we didn't have any further trouble with it at all.

Q82. What do your mean by getting the color down to (691) where you wanted it? How would you go about meeting this situation? A. Well, all inks vary. The same way with the stock. It all varies. Some will take one ink. Some with take more ink. Some will take less ink. If you carry too much ink on one side of the paper, it will offset on you.

Q83. Well, as I understand your testimony, what you mean by getting it down to where you want it is that you adjust the fountain of the press? A. Adjust the fountain, yes.

Q84. Is that something that you ordinarily have to do in starting a run on a printing press? A. Yes. Any job, any kind of paper, any kind of ink, that has to be done.

Q85. Then your testimony, as I understand it, is that when you had your fountain adjusted you then had no more trouble with this cover in the way of offsetting? A. No trouble.

Q86. Are you speaking now about any particular colors or about all of them on that cover? A. Well, I don't really know. I don't remember much about this orange, how we

happened to do with that, but I do remember the silver and the black. This orange, I think that was a standard ink that they had down there and I don't think that they mixed anything with this.

(692) Q87. Did you know what Mr. Jirousek mixed in his ink to get this effect? A. No; that is something I couldn't tell you.

Q88. And was that the only issue of Metal Progress that you recall using any ink specially mixed up by Mr. Jirousek? A. No; I don't think it is. I think we ran several issues. I don't remember now how many there were or what they were at that time.

Q89. I have here several issues of Metal Progress and I would like to have you look them over, and see whether or not you recognize any others of this group as being ones in which Mr. Jirousek's ink was employed. A. To tell you the truth, these magazines all look familiar to me because I ran them. This is one of them, I remember.

Mr. Free: The witness has pointed to a magazine which I will have marked for identification as Defendant's Exhibit V-1.

(Marked Defendant's Exhibit V-1 for identification.)

A. Now, here is another one. I think I remember running this one here with that ink.

Mr. Free: The witness has referred to an issue of Metal Progress dated January, 1932, which I will have marked for identification as Defendant's Exhibit W-1 for identification.

(Marked Defendant's Exhibit W-1 for identification.)

(693) The Witness: I remember running these, but I don't remember whether he had his ink lined up on them, or not.

Q90. You referred, Mr. Pellinger, to an issue of Metal Progress dated December, 1931, heretofore marked Exhibit Theuer G. You stated, I believe, that you recall running that cover? A. Yes.

Q91. Did you run it yourself? A. Yes.

Q92. And that cover was printed with Mr. Jirousek's ink, was it? A. I believe it was.

Q93. Which of his colors was the ink that you are referring to, or did he fix up both inks? A. I believe he fixed up both inks on this.

Q94. And the colors of those inks are what? A. They are the red and the black.

Q95. With Mr. Jirousek's inks were you able to run that cover satisfactorily? A. I was.

Q96. Did it make what you considered a good printing job? A. Yes.

Q97. I call your attention to a magazine known as Metal Progress, dated January, 1932, which has been marked for identification as Defendant's Exhibit W-1, and which I believe you also stated was run with Mr. Jirousek's ink; is that correct? A. Yes.

Q98. You ran that yourself, did you? A. Yes.

Q99. How many colors are there on that cover? A. The (694) blue and the black.

Q100. Were both of those Mr. Jirousek's inks, or not? A. I am pretty sure that it was run from the inks that Mr. Jirousek had mixed up.

Q101. Are you referring to one color or both? A. I believe it was both colors on that.

Q102. And that is Exhibit W-1 for identification? A. Yes.

Mr. Free: I offer in evidence as Defendant's Exhibits V-1 and W-1, the two magazines previously identified by the same letters for identification, V-1 being the issue of Metal Progress dated December 1931, and W-1 being the issue of Metal Progress for January 1932.

Mr. Watson: I object, your Honor, on the ground that the composition of the ink used has not been shown. It is immaterial and irrelevant.

Mr. Free: Well, he said it was a physical magazine run with that ink which had the physical characteristics after being heated.

The Court: Objection overruled.

(Defendant's Exhibits V-1 and W-1 for identification received in evidence.)

The Court: We will take a recess at this point.

(Short recess.)

Mr. Free: I will offer this September 1931 issue (695) of Metal Progress formerly marked Defendant's Exhibit O-1 for identification.

Mr. Watson: I object to it on the ground that it is immaterial. The ink used in it was not proved.

The Court: Well, it was proved that it was a quick-drying ink.

Mr. Free: Yes.

The Court: It is admitted for that purpose, a quick-drying ink job.

Mr. Free: Yes, the same as the other ink jobs.

(Defendant's Exhibit O-1 for identification received in evidence.)

By Mr. Free:

Q103. Do you recall whether or not you ran other covers for Metal Progress than the three that you have identified with Mr. Jirousek's ink? A. Yes, I think we ran several of them, but I don't recall distinctly just which ones they were. Precisely, I know that there were several of them, but I don't remember which ones.

Q104. Do you recall whether or not any jobs besides the Metal Progress covers were run with Mr. Jirousek's inks

by you? A. Yes; there was one in particular that they were running at that time. That was the Garden and Home.

Q105. Was that a magazine? A. Yes; that was a magazine.

(696) Q106. Was it a monthly magazine? A. Yes.

Q107. I have here some issues of Garden and Home Magazine. I will show them to you and ask you whether or not you can point out any of them as having been run with Mr. Jirousek's ink? A. I believe that these were run with Mr. Jirousek's ink.

Q108. By "these" do you mean one or more of the group of three magazines that I have handed you? A. I think that all three of them were run with them, as much as I can remember.

Mr. Free: I now offer in evidence as Defendant's Exhibit X-1, "Your Garden and Home," issue of January 1932; as Defendant's Exhibit Y-1, the February 1932 issue of "Your Garden and Home Magazine"; as Defendant's Exhibit Z-1, the March 1932 issue of "Your Garden and Home Magazine".

Mr. Watson: The same objection, your Honor.

The Court: Let me see them.

(Exhibits handed to the Court.)

Mr. Free: The same thing, your Honor, quick-drying ink.

The Court: All right.

(Marked Defendant's Exhibits X-1, Y-1 and Z-1.)

By Mr. Free:

Q109. Referring to Exhibit W-1, dated January, 1932, you have testified that you recall printing that. When did (697) you print it, approximately, if you can tell us? A.

Well, January 1932, probably the early part of the month, or it might have been December, the latter part of December 1931. It was along in there, but I don't remember just what part of the month it was.

Q110. In other words, the exhibit, about which I have been asking you, would have been printed either in the early part of the month for which it is dated or in the latter part of the preceding month? A. That is right.

Q111. Would that be true also of Exhibit V-1? A. Yes.

Q112. How about Exhibits X-1, Y-1 and Z-1? When would they have been printed by you, if you know? Exhibit X-1 bears date of March 1932. When was that printed, if you recall? A. That is something that I can't remember now. I don't remember when it was printed, but I would say that it was printed in the latter part of the previous month when it was dated, when it was supposed to be issued out, but whether it was printed in the same month that it is dated, I don't remember that because they have stopped printing that altogether.

Q113. Would it have been printed within, say, thirty days of the 1st of the month marked on it, either way? A. Either way, yes. I would say yes, either way.

Q114. You say that this magazine is no longer printed? A. Not that I know of. It isn't printed by us anyway. I (698) don't know if it is or not, but I don't think it is on the market now.

Q115. Do you recall when the Evangelical Press stopped printing this magazine called Your Garden and Home? A. That I can't tell you. I don't remember.

Q116. Mr. Pellinger, did you like these Jirousek inks? A. Yes; I would say that they were fairly satisfactory. They worked very well.

Q117. Just what do you mean by that? What did they accomplish? What did they do? A. Well, it seemed that we got away from quite a bit of offset. That was our main trouble.

Q118. For the sake of the record, Mr. Pellinger, what do you mean by "offset"? A. Well, what I mean by offset is that when you lay one sheet on top of the other the sheet that is on the bottom will sometimes smudge on the back of the sheet that is on the top. It will cause a smudge on there.

Q119. Does offsetting occur on the press itself? A. Well, it will at times. No; not on the press. More of what we call offset is on the paper itself.

Q120. What happens to the press on a work and turn job on the second run if the ink is not thoroughly set? A. Well, if it isn't thoroughly set it usually starts piling up on the back or on the tympan paper that is on (699) the cylinder. It is an oil paper and it starts piling up on there wherever there is any impression from the other side on that side.

Q121. What effect, if any, did the Jirousek ink have on that action? A. Well, we found out that in short runs—what we mean by "short runs," when there is only a couple of hundred runs or so—that we can back the job up, say, within fifteen minutes to half an hour sooner than—oh, it might be longer than that, but we could back it up sooner than we can with any ordinary ink. We found that out.

Q122. What about the printing of one color on top of another? Is that affected in any way by the rate of the setting of the ink? A. Well, it is if your one color isn't dry enough, that your other color sometimes will not take on there.

Q123. And what effect, if any, on that situation did the Jirousek ink have? A. Well, we found out that we could run from one press, if the job is on two presses—we found out that you can run from one press to the other, and you can run so many thousands and then take it right over on the other press and continue with the other one.

Q124. One of the witnesses here mentioned a spray in connection with offsetting. Can you tell us what that is?

A. Well, that is a solution that they use, which (700) is blown through a gun, and it comes out in real fine powder which lays in between the two sheets, and that holds the sheet up off the other sheet just long enough so that the bottom sheet is set. What we mean by "set" is so that it won't offset on the top sheet.

Q125. Does that enable you to work and turn faster? A. No; I wouldn't say it enables us to work and turn your job faster. No; I wouldn't say that.

Q126. You have said that it prevents offsetting. Under what circumstances does it do so; that is to say, where? A. Well, on the paper itself.

Q127. That is, when it is being stacked? A. When it is being piled up; yes.

Q128. At the end of the press? A. Yes.

Q129. But, as I understand your testimony, that doesn't enable you to work and turn any faster? A. No; that has nothing to do with the ink; that is, as far as the drying power of it is concerned.

Q130. You didn't use sprays in connection with the Jirousek ink, did you? A. No; we didn't have that at that time.

Cross examination by Mr. Watson:

Q131. Have you ever seen three-color printing on a rotary web press? A. No; I haven't, to be honest with you.

(701) Q132. You don't know whether one color is put down on the other when they are both wet, do you? A. I have heard that it is done, but I have never seen it or never worked with it.

Q133. Now, I don't exactly understand your testimony. You say that you printed this silver color. Where is the silver color? Was the sheet you started with the size of the front and back cover together or was it bigger than that? A. It is twice that size.

Q134. Twice that size? A. Twice that size, yes.

Q135. And you were operating two printing presses at the same time; is that right? A. Well, I was helper on the one and another fellow was working on the other, but we worked together on it.

Q136. What was the first thing that you did? A. Well, now, what do you mean by that?

Q137. Well, suppose you are ready to print this cover. Just what do you do? What was the first thing that you did? A. After we got it all on and got our position O. K., got it made ready, put our ink in the fountain.

Q138. Which ink? A. The silver.

Q139. On one or both presses? A. One press.

Q140. Then what did you do? A. Started running it.

Q141. The other press wasn't running? A. No; it wasn't running yet.

(702) Q142. And did that just print solid silver all over here or were there some breaks in it? A. No; that was just one page. Silver was just on the one page. Just one page was run silver.

Q143. Well, then, there was in the press some kind of a solid block to print that piece of silver? A. That is right.

Q145. That is all you printed, isn't it? That is all you were printing on this press that was running the silver then? A. That is all.

Q146. How many sheets did you run through that press? A. Do you mean the amount run on the job or——

Q147. Well, did you do anything else before you had run all the sheets through that press? A. Of course, we watched it. We ran through to get our color checked O.K., to see if the color was even all the way across and then, of course, to see if it offset, or not, on the back.

Q148. What was there to make it offset? You were just printing on one side then, weren't you? A. Why, yes, (703) but, you see, you are laying one sheet on top of another sheet.

Q149. Do you mean that it offset in the pile? A. In the pile; yes, sir. That is the only way you can get offset is when you are piling stock.

Q150. I see. And then when you were satisfied that it wasn't offsetting too much you kept running all your sheets through that one press? A. Yes.

Q151. Now, was the other press standing still all that time? A. No; we were making ready on that press.

Q152. You weren't running on it? A. Not until we got a certain amount of the silver ones off so that we could go ahead and put it on the other press.

Q153. Well, now, how many of the silver ones did you get off before you started running on the other press? A. I would say probably half of the job; that is, half of——

Q154. Would you say that was about two thousand sheets? A. That would be about it if the run was eight thousand.

Q155. About how long does it take to print two thousand sheets? A. The time varies. Say, probably an hour. I mean from about an hour and fifteen minutes to an hour and a half, two thousand, or as much as two hours. It depends upon how much trouble we had with it in starting it up.

(704) Q156. Well, then, at the end of, say, two hours you take these two thousand sheets, that have silver on them, and carry them over to the other press? A. Well, yes; we took them over to the other press.

Q157. What did you do in the other press? A. We take them and, as we say, repile them. You pile them in from the top down so that the first ones that you started with on the silver were started on the black. Consequently, those are the driest ones. So, we started from there again.

Q158. When did you print that? How did you print on the second press? A. I believe it was the black that we run, the following color, on that particular issue.

Q159. On which side of the paper did you print it? I mean was it on the same side as the silver? A. The same side as the silver.

Q160. The same side as the silver? A. The same side as the silver.

Q161. It came right down on the silver? A. Yes.

Q162. Well, what was the next step after that? A. Well, after we had finished the silver and got a certain amount of the black on, or maybe we got the whole color off it—I don't know how it panned out, but right away then the next step is to back it up on the other side of the sheet.

(705) Q163. Well, how about the yellow or the orange? Did you do anything about that? A. No; we didn't do anything about it until the silver was off because at that particular time, I believe, that cover was made on those two presses, those two swing back presses.

Q164. That is after you got the silver and black printed on one side of each sheet? A. Yes.

Q165. You did the same thing with the other side, printed the silver and black on the other side? A. Yes, sir.

Q166. Then, as I understand it, your double sheet was a duplicate of this sheet that we see here on the magazine? That is, you had two plates printing silver on two different parts of your double sheet; isn't that correct? A. No; we only had one plate. We only had one silver plate there.

Q167. Did you print on both sides of the sheet? A. Yes, sir. What was printed on the first side was printed on the second side.

Q168. Then you cut them apart afterwards? A. Yes, sir.

(706) Q169. Well, then, after you got the silver and black all printed on both sides, what did you do next? That is, did you clean up the presses? A. We cleaned up the presses, certainly. Well, I think before they got the black done they had the silver all off; that is, they run it on the black on the second side. When your silver is done the press

is cleaned up and your orange is put on. When the black is finished, it goes over and the orange is registered in, made ready, and your fountain set, color set, and you are ready to run.

Q170. Then you have to put all the sheets through the orange press twice, don't you? A. That is right.

Q171. How much time elapsed between the time you finished the black and silver on the one side before you backed up with the black and silver on the other side? A. That time now I wouldn't know exactly. It might have been possible that we got through with it at quitting time; that is, if we got enough of the black off on one side, and then in the morning we could start backing them up.

Q172. Well, this is, in general, the same way that you operated with all linseed oil inks? A. I don't know anything about running with linseed oil or anything like that.

Q173. You have never had anything to do with (707) linseed oil? You didn't know that there was any linseed oil in any of these inks? A. I couldn't tell you today what any of the inks have got in them because all our inks come, as a rule, mixed up. They are already in the cans, and all we have to do is to put them in the fountains.

Q174. You have talked about Jirousek's ink or inks. How did you tell them from any other ink? A. Well, the only way that I could tell them from others was that there was an odor, but if the odor was here right now I couldn't tell you what it was like.

Q175. Did you see Mr. Jirousek mixing up ink? A. I have seen him mixing up things back there, yes.

Q176. He never told you what he put in them? A. No, sir.

Q177. When he got one mixed up he would say, "Try this"? A. Yes.

Q178. If it didn't work, then he would mix up something else and say, "Try this"? A. Yes.

Q179. You would try another if one didn't work? A. Yes, sir.

Q180. You would try different ones until you succeeded in getting one that would do the job? A. Yes, sir.

Q181. But, after all, there were other inks that you could buy that would work on a job of this kind, weren't there? A. I didn't understand what you said.

Q182. I say, there were other things that you could (708) have gotten or could have bought that would have worked on a job like this? A. Oh, I imagine you could have gotten other inks, but I guess the idea was that they wouldn't set fast enough and at that particular time, if I am not too much mistaken, we mixed our own silver up. We had the silver. We got the base. I think we bought the silver and the varnish base separately.

Q183. Did you do that with all your silver ink? A. At that time, yes.

Q184. And did Mr. Jirousek mix them all or did somebody else mix some of them? A. Well, at times, before he got on to his own ink, why, we would mix them ourselves; that is, we would mix up the silver and the varnish together. Sometimes we got too much of one or the other in there because we never had any set formula on it.

Q185. Now, looking at this issue of Metal Progress, March, 1932, I notice that there is some silver printing on a page of it, page 64. Did you have any trouble in printing that page? A. That I don't know anything about.

Q186. You didn't print that? A. No.

Q187. You didn't print any of the inside of this magazine? A. No.

Q188. You have a very good memory for what you (709) printed so long ago, haven't you? A. Well, I have been down there long enough.

Q189. Do you remember everything that you printed between that time and this time? A. I will tell you if I see some of it. I have a vague recollection of it, but to tell you offhand what this is and that is, I can't say.

Q190. It is pretty hard to remember which of these things were printed with inks that you got out of stock

and which of them Mr. Jirousek mixed up, isn't it? A. Of course, there were a few of them that we had inks that we took special notice of and several of these covers have been run again, but not with this ink. He wasn't there when they were run.

Q191. I see. They ran some of them the second time, did they? A. Yes. We had sprays at that time. You see, they were probably run two or three, or four, years apart, or even five years apart.

Q192. When did you get the spray? A. I would say about three or four years ago; something like that.

Q193. Of course, the sprays had nothing to do with one color being printed over the other? A. What did you say?

Q194. I say, the sprays had nothing to do with the way one color printed over the other? Did you tell us (710) that? A. As far as printing one color over the other, the spray had nothing to do with it. The only thing that the spray did have anything to do with was the offset. It eliminated the offset.

Q195. And so far as printing one color over another was concerned, you did that after Jirousek went away, and you were still able to do it, weren't you? A. We did the best we could with it.

Q196. It didn't come out so bad, did it? A. At times it did. At other times it didn't. It depends upon what the ink was.

Q197. It made some difference in the kind of paper you had, too, didn't it? A. Well, it depends upon the different kinds of stock that you have to use, but that Metal Progress always used just that one certain kind of stock.

Q198. Do you mean that they haven't changed the stock since 1932? A. They might have, but I don't know. I wouldn't say offhand if they had, or not, but it is pretty near the same as it always has been.

Q199. It is the same kind of stock as the other magazines that you have there? A. Which one? Do you mean these here?

Q200. Yes. A. I don't know.

Mr. Watson: Referring to Defendant's Exhibits (711) X-1, Y-1 and Z-1.

(Continuing.)

Q201. You don't know whether that is the same stock, or not? A. It is not.

Q202. It is not the same stock? A. No.

Q203. It is a softer paper, isn't it? A. Yes; it is a softer paper.

Q204. Going back to this September, 1931, magazine, do you remember whether or not you had any trouble with the orange offsetting? A. I don't think that we had so much trouble with it because we didn't have to run it as heavy on that.

Q205. That is the one that you printed on top of the others, isn't it? A. Yes, sir; I believe that was the last one that was run on that.

Re-direct examination by Mr. Free:

Q206. Mr. Pellinger, you spoke about repeating covers in Metal Progress. Do they do that sometimes? A. They do it sometimes, yes.

Q207. How often do they repeat their covers? A. It is hard to say. It all varies.

Q208. Would they re-use a cover, for instance, in the same year? A. No; I don't believe they would.

Q209. Have they ever done so, to your knowledge? A. I don't think so.

(712) Q210. Do you know whether or not they have? A. Do you mean run the same cover in the same year?

Q211. Yes. A. I am sure that they haven't.

Q212. When they repeat a cover, do they, or not, change the date on the magazine? A. They change the date on the magazine, yes.

Q213. I believe you stated that in running the cover of Exhibit D you sent the sheets through one of the presses first and printed the silver on one side; is that correct? A. That is right; yes, sir.

Q214. And then before you had finished running the four thousand sheets that you had to run through that press, after you had run only about two thousand of them you took that two thousand over to a press for printing the black and began to run the black? A. Yes.

Q215. And then you finished your silver run on that side of the paper while the black was running? A. That is right.

Q216. Then you took a certain quantity of the black and reversed those sheets and transferred them back to the silver press again, did you not? A. Yes.

Q217. What was that quantity, approximately? Was it the same as before or different? A. I would say that possibly it might have been a little different. It might not have been quite as many.

(713) Q218. In other words, if I understand you, you started running the sheets through your silver press, printed a certain number, then you started the second press, then you started running them through the black press after printing the silver on them—does that question make sense? A. I can't make any sense out of it.

Q219. Then I will try again. You said that you began to run the black after you had run thousand silver? A. That is right; yes.

Q220. And then you said that you began to run the silver again on the other side? A. On the second side.

Q221. On the second side after having printed the back a little sooner. Now, I was simply trying to understand what you mean by that. A. Oh, I see what you mean now. In other words, what I meant was that we have been able to back the job up a good deal sooner than if we had other ink. What I mean is, this ink, it turned out that it dried a good deal faster and it was possible to start over on the other press. Now, how much time there was between start-

ing on the second side of the silver and when we finished, that is, since starting that color and running so many off, and take it over on the silver, I don't know. I can't say what time was lost in between the two times on the two presses.

(714) Q222. In other words, you wouldn't be able to say then, if I understand you correctly, that after having run two thousand of the black impressions you then began to back up with silver? A. Not me. I wouldn't say. That was probably within half an hour or an hour. If it turned out that way, of course, I don't remember. It might have been that we got through or we got enough of them through on one side when it came to quitting time, so that they lay overnight, and in the morning we would start to back them up again.

Q223. Would the same thing in general be true in connection with running the second silver and black impression on the second side of the sheet? A. It would be the same condition.

Q224. In running the second silver impression then I take it you ran about two thousand of those and then switched those printed copies over to the black press again? A. Yes.

Q225. Is that something which you could do with other inks with which you were familiar at that time? A. Well, we couldn't exactly do that that way. We had to let them set for a certain length of time so that they would be dry enough so that we could put them in the press, but we couldn't let them lay too long or we couldn't let them dry too much, with silver at that time.

---

(715) Mr. Free: I will now offer extracts from the deposition of Peter Dennerlein, a plaintiff's witness.

Extracts read in evidence from deposition of Peter Dennerlein, Manufacturing Director of Crowell-Collier Publishing Company (Extracts from this deposition previously read in evidence are printed at record, pp. 235-238).

Direct examination by Mr. Watson:

The Witness: The rotogravure ink contains a more volatile solvent and is a very thin liquid type ink and evaporates very quickly, by the mere blowing across it of some hot air whose temperature is approximately 135 degrees Fahrenheit.

* * * * * *

(716) *Cross examination by Mr. Free:*

Q. You spoke a moment ago about the speed of printing of rotogravure. That is about 1200—— A. 1200 feet a minute; yes.

Q. How does that compare with the heat-set letter press ink? A. It is faster; the highest speed we have run the paper in letter press printing is 800 feet a minute. That is true as to printing with two colors and not four.

Q. How do you compare the quality of the printing through rotogravure to letter press printing with the heat-set process? A. Mr. Free, that depends entirely upon who you speak to.

Q. I am speaking to you as a printing expert. A. Thank you for the compliment. I have been a great exponent of rotogravure and I have seen it develop in the last seven years much beyond my belief or imagination, in seven years; and today I claim that the best rotogravure is better than the best letter press, although both depend on the human element, and as long as you have the human element you will have some not as good as the other in both processes.

Q. I have been told that printing according to the heat-set process is a sort of compromise in order to obtain speed;

that is, you sacrifice quality of printing to get (717) speed. Is that a fair statement? A. Not in my opinion; no. Of course, if you try to obtain too much speed in letter press, why, of course you run into two difficulties. One, you use so much heat in order to dry your ink that you dry some of the ink even before it gets on to the sheet, and therefore it does not trap harmoniously—you are talking of four colors?

Q. Yes. A. In two colors I would say the only difficulties encountered now are at the delivery end of the press. If you deliver them in flat sheets you cannot lay your sheets down fast enough. If you deliver them in folded units or signatures—there has not been a folder built that will get rid of the printed product fast enough for the printing press.

I think furthermore that some printers have tried to get so many pages on to a cylinder that they have widened out the press to such an extent that they simply couldn't keep quality up. I am thinking of some who have 65-inch cylinders in length or width, and we believe that is entirely too wide. We use 48-inch cylinders. To put it probably in better terms, we have four rows of plates per cylinder and they have six, and I think that also is a stumbling block in getting the best quality that could be gotten from the process.

(718) Q. How would you compare the quality of letter press printing with heat-set ink with the quality of printing done with the old oil varnish inks? A. Well, there again it depends entirely on the nature of the colors you print. I believe black, or black and one color, will trap and the heat flash ink product is much superior to the old oil or varnish type of ink. In four colors I think the best "Vaporin" or heat-set ink job is in most cases just as good except when they try to get too much speed or use an inferior sheet of paper.

Q. You spoke of speed several times. Can you remember from your recollection as to whether or not the speed of

presses has increased progressively year by year since say 10 or 12 years ago? A. Yes; not year by year, but there have been three steps forward. The sheet feed and the four-color or merely color press, improved by Cottrell, printed on one side of the sheet in four colors and on flat sheets. It was first stepped up in speed by the elimination of what was then a slip sheet or blotter through the introduction of wax which was sprayed on, first melted and sprayed on,—paraffin was sprayed on the printed sheet, and we were immediately enabled to get a higher production.

The next step forward was the introduction (719) of a roll-fed press, or web type press. You start with a roll of paper instead of feeding the paper to the press in sheets, and immediately got higher speed. From that we went into the perfecting press 4-4 and about the same time we got the high speed two-color press printing two colors on both sides. The presses were built more rigid and enabled us to get higher speed because of the type of ink we were using which was again the "Vaporin" or heat-set or heat flash ink.

Q. Now I also have been told that an ink maker is a sort of a custom tailor,—he fits his ink to correspond to the requirements of the job; that true? A. Fits it to suit the job; yes.

Q. And so as the speed of the presses increased, you had to change your ink to conform for example? A. That is correct.

Q. As a matter of fact the first heat-set ink which you saw or knew about back in 1935 is quite different from the ink which you are now using, is it not? A. Well, are you speaking from the standpoint of a two-color or a four-color?

Q. We will take the two-color first and talk about the four colors later, if you please. A. I think the ink maker has improved his two-color inks in the past seven years.

They weren't quite as stable in 1935 as they (720) are today; and the same with the four-color inks. Of course the first time I ever used four-color inks of a heat flash or "Vaporin" type was in 1937—late '37 or early '38.

Q. Those include the Levey inks? A. And they improved too, as to stability and in their harmonious laying on top of each other and having the right consistency in each succeeding color, and they also dry better.

Q. So it has been pretty much of a progressive improvement in inks ever since you saw them? A. Yes.

Q. Now as to stability of the early inks; as I understand it, in 1935 you sometimes had trouble with the ink drying on the roller and the result was the web would tear and break; that true? A. Yes, that is true of the heat flash ink, and also true of oil type inks. In other words if they try to crowd too much drier in it, the inks will perform in approximately the same way,—the ink would dry on the press and also have a tendency to dry on the plates and therefore break the web.

Q. In case of heat flash ink it was instability due to evaporation of the solvent, was it not? A. Well, I would imagine; I think that is true.

Q. Now I also understand you know quite a lot about the manufacture of inks? A. For the record? —is this off the record?

(721) Q. No. A. Well, I supervised the making of ink from 1928 until I left Dayton in 1937. We made very little heat flash inks. The fact is we didn't want to make them.

Q. In those early inks that you purchased from I.P.I.—1935 I believe you said? A. Yes.

Q. When you were with McCall's? A. Yes.

Q. Do you know what sort of a solvent that ink contained? A. No.

Q. You do know, however, the solvent in use was different than the solvent which was in the 1935 ink? A. I really couldn't answer that intelligently because I don't know the types of solvent, if there are two being used or if

there is a different type of solvent being used. They tell us, but what it actually is, I don't know.

Q. Did you ever have trouble with your composition rolls in 1935 with I.P.I. ink? A. The only reason we had any trouble with our printing rolls was the fact we had the heat so close to the print rolls that they were exposed to the heater, and in the later type of press, why, that was taken care of by moving the oven or lengthening the leads and seeing the heater wasn't too close or as close as before to the printing rollers.

(722) Q. How hot do those ovens get, about? A. Well, of course it depends entirely on the speed of the press. I am quite sure it is around 1400 degrees.

Q. Fahrenheit? A. Fahrenheit, yes. We don't use that much heat but some people do. We use about 950 degrees I think.

Q. Now as the speed of the presses increase and they had been running for about an hour or so, they develop considerable heat by reason of friction and tack in the ink rolls? A. Yes, they do.

Q. Have you any idea how hot they get? A. No.

Q. But they get pretty hot? A. Well, you can still put your hand on it. It is probably 100 or 120 degrees.

Q. Fahrenheit? A. Yes.

Q. So if the ink is stable on the cold press it might not be stable after the press had been running for a while because of the heat development; that right? A. Well, I really never actually ran into that difficulty. It is safe to assume if the ink was not made to be stable at that temperature, why, it would evaporate more rapidly or too rapidly.

Q. I have been told that one of the improvements that have been made in heat-set inks to avoid that very difficulty was the substitution of a higher boiling (723) solvent which would not evaporate after the press began to run. Do you know about that? A. No, I do not.

Q. Now insofar as rotogravure inks are concerned, the solvent there as I understand it is much more volatile than

the solvent used in the flash or heat flash ink; that right? A. Well, one solvent is more volatile, or because of the nature of the ink we can use more solvent. I am not in a position to say.

Q. Both the rotogravure and heat-set process work out the same in that respect; that the ink is applied to the web and then the web is heated?— A. Yes.

Q. The difference being that with heat flash ink you use higher heat than you do with rotogravure ink?' A. That is correct.

Q. Now from your experience as an ink maker, isn't it the practice to thicken thin ink by putting in more resin? A. No, my practice in thickening ink was to put in a heavier varnish. We used to add a No. 5 varnish which was more like glue which would hardly flow, thereby creating more tack which was necessary in order to make the colors ride on top of each properly to get the proper mixture of the colors for the printing effect.

Q. You mentioned Levey inks as having been used by you in 1935 at McCall's? A. In 1935?—1937.

Q. Was that the first heat flash ink that you knew (724) about? A. No; not the first heat flash ink because we used "Vaporin" ink from I. P. I. in 1935, and I came in contact with Levey in 1937 when I first came to Springfield.

Q. Was the Levey ink different from the I. P. I. ink? A. Not as far as the printer was concerned.

Q. Did you ever hear when you were at McCall's of similar heat-set ink sold by Charles Eneu Johnson Co. called Perspective half-tone black? A. Yes, I did.

Q. When was that, do you know? A. 1935, or it may have been 1936. I really couldn't say but it was thereabouts.

Q. Was it before you first used the "Vaporin" ink? A. No.

Q. Now, as the speed of the presses increased you merely changed the ink as I understand it; that right? A. The speed of the presses increase? —well, of course that was a major change from the oil type of inks to "Vaporin" or heat flash type of inks.

Q. And again you conformed the inks to fit the press requirement as always in those instances, that right? A. We never changed any of the "Vaporin" or heat flash inks in their consistency or in the amount of solvents or the amount of varnish or the amount of drier. We either used it as it came or rejected it and made the (725) ink man change it.

Q. Did you ever have occasion to spray rollers? A. Yes.

Q. With I. P. I. ink in the fountain? A. Yes, when we shut down for a long period such as making a change, in making ready the rollers, where we didn't know it would be done for a half hour or for an hour, we would spray a solution which was supplied by them which would retard the drying of the ink on the rollers; we had it on both I. P. I.—in fact on all heat flash inks.

Q. When you made your own heat flash ink at McCall's, what solvent did you use, do you know? A. No.

Q. Was it classified as a petroleum solvent or organic solvent? A. I can't really tell you about that. No, really I can't.

Q. You had been using a tympan on rotogravure printing?— A. No.

Q. The ink is dry as it comes out of the press? A. Yes.

Mr. Free: I do not think I will read the rest of the cross examination, unless, you want it.

Mr. Byerly: We will put some of this in in rebuttal on the question of commercial success. I won't offer any at this time.

* * * * * *

(726) By Mr. Free:

Q. Did you have heat-set inks in operation at any time when any Sinclair & Carroll representative visited your plant prior to your first purchase from them? A. No. The only time they saw any competitive ink running was on a similar press running next to their own. We had men com-

ing from Levey and I.P.I. or Sinclair & Carroll, or anyone who furnishes ink. They are at liberty to come in here and watch the performance, in fact we encourage it, to see how an ink is performing and behaving.

* * * * * * *

Q. You have been questioned on web feed presses and sheet delivery presses. I would like to ask you whether heat-set ink would work as well on one as the other providing the heat was used at delivery end? A. Well, it makes no difference as far as the ink and the heat are concerned whether you deliver it in sheets or in folded signatures. If you deliver it in folded signatures you naturally are having to run higher speed because you don't have a way of letting your sheets set as they come out of the press.

Q. A flat bed press would work just as well with heat-set ink if you had the proper heater, wouldn't it? (727) A. Correct; yes.

Q. Now as a former ink man, in order to make an ink which would evaporate less fast than say rotogravure ink, you would simply use a higher boiling solvent in it; wouldn't you? A. Less fast than the rotogravure ink?

Q. Yes. A. I would use less solvent.

Q. Or putting it in another way, you would use a solvent which would not evaporate as fast, wouldn't you? A. That is true.

Q. That is just plain horse sense, isn't it? A. I don't know whether it is horse sense or not, but I sometimes accuse the ink makers of not having any horse sense; at other times they do things which really floor me.

Q. I am asking you about your horse sense; you would do a thing like that; that is plain horse sense, as far as you are concerned? A. I would naturally call in the solvent manufacturers and start to manipulate.

Deposition of Peter Dennerlein, for Plaintiff—Re-direct—Re-cross.

Q. You go to the solvent manufacturers and say, I want an ink which does not evaporate so fast, have you a solvent which would do the job? A. They may not be able to tell me, but I would try it out.

Q. And if they had a solvent you would try it out? A. I think I would; yes. I always told the ink makers—the manufacturers, when they solicited me, I don't care (728) what you put in the ink as long as it works.

Q. And you buy ink from whomever can furnish the best ink—the ink you want, don't you? A. Well, the best ink and at the best price.

Re-direct examination by Mr. Watson:

Q. Going back to what an ink maker might do with a gravure ink to make a letter press ink. A mere change in solvent would not change one to the other, would it? A. I don't think you can make it, no, I don't think you can. You cannot make a letter press ink with simply solvent because you have to have a varnish in there to give you the necessary tack.

The Court: What do you mean by tack, stickiness?

Mr. Byerly: Yes.

Q. You never did try to make a letter press ink of a gravure ink? A. No.

Re-cross examination by Mr. Free:

Q. If you wanted to make a letter press ink which evaporated less fast than rotogravure ink you would use a higher boiling solvent in the l[illegible]r press ink, wouldn't you? A. Not necessarily; I may use [illegible]ame solvent but by the mere introduction of varnish I would reduce the volatility of the ink.

(729) Q. So you have to use higher heat to dry it. Another way of doing it would be to use a higher boiling solvent? A. I don't know; that is getting pretty technical now. I am afraid I would have to get back into the laboratory to find it out.

Q. If you had such a condition you would ask the solvent man if he had something to do the job? A. I would ask him what solvents he had and try them out to see if they work.

Mr. Free: That is all.

The Court: What have you got next week?

Mr. Free: I have some witnesses, about two days of it.

The Court: How much have you got, Mr. Byerly?

Mr. Byerly: I think two days. It is a little hard for me to be sure until I see what my brother puts in, but I should think it would take at least two days.

(Adjourned to January 25, 1943, 10:30 a. m.)

---

(730) New York, January 25, 1943;

10:30 o'clock A. M.

TRIAL RESUMED.

Mr. Free: Mr. Carroll.

ROY CARROLL, called as a witness on behalf of the defendant, being duly sworn, testified as follows:

(731) *Direct examination by Mr. Free:*

Q. Mr. Carroll, where do you live and what is your occupation? A. I live at 73 Locust Road, Winnetka, Illinois—a suburb of Chicago.

Q. And your occupation? A. My occupation—I am in charge of the Sinclair & Carroll Company of Chicago business.

Q. You are an officer of the company, are you not? A. Yes.

Q. And what is your office? A. I am vice-president.

Q. Now give us a brief description of the products produced by Sinclair & Carroll Company. A. We produce about every type of printing ink for the letter press and offset printing field. We manufacture them from the raw material, making them into inks; adjust them to the requirements of our different customer's printing presses.

Q. And what sort of inks are those? What is the general classification? A. Oh, I term the general classification the common ordinary oil type of ink as always used, namely, linseed varnish.

Q. And that is the large proportion of your business? A. That is the large proportion of our business.

Q. Do you make any other kinds of inks? A. Offset printing inks.

(732) Q. Any other—like heat-set? A. Heat-set, yes. We made heat-set, too, and are making them.

Q. Now when did you start in the printing business? Give us a brief description of your experience and history in it. A. In 1913 I first started to work in the printing ink business, and I have been in the business ever since with the exception of a period of about fourteen months during the last World War.

Q. How did you start? Tell us about that.

The Court: Are you talking about him or his company?

Mr. Free: No, about him, his own history.

The Court: Very well.

A. Well, in the most ordinary job, that is, of color matcher where you begin to learn about blending colors together, which later on leads to the formulation of printing inks from

the raw material. I was doing that during most of the time before the last World War. On my return from the Army I worked for a short period in New York and then was sent to Chicago as a salesman for the company I was working for. In 1923, I believe it was, we organized the Sinclair & Carroll Printing Ink Company and I have worked consistently ever since for the same firm.

Q. How large is your company in the field? A. We (733) are considered small. We try to grow but we have our limitations because we haven't got the resources.

The Court: You say you have been with this company since when?

The Witness: Sinclair & Carroll since 1923. That was the date of its organization.

Q. Now you keep pretty closely in touch with the manufacture of inks in your Chicago plant, do you not? A. Oh, yes; I do.

Q. And I believe you said a while ago that you matched inks to the press and printing conditions and requirements of your customers? A. Yes. I supervise them closely along with our plant formula.

Q. It has been said here that a printing ink is a tailor-made job. It must fit the particular requirements of the job to be done, is that right?

Mr Byerly: Your Honor, it seems to us that is rather leading. He cannot cross examine this witness.

The Court: Objection overruled.

A. That is true.

Q. And when you make up an ink what do you want to know?

The Court: That is a little leading.

Mr. Free: Yes.

The Court: But it is preliminary.

(734) Mr. Free: Well, I am saving time.
The Court: We know what his line is.
Mr. Free: Will you read the last question?

Q. (Read.) (Continuing) From the customer: A. Oh, I want to know the type of press, the speed of the press, the kind of paper stock. Those are the general—or rather that is the general information that we have to have.

Q. And from that information state whether or not you fit your inks accordingly? A. Oh, yes, we fit them accordingly, always do.

Q. Now in the manufacture of inks tell us whether or not you buy your ingredients from outside sources? A. Oh, yes. We do buy our raw material, such as the varnishes and the oils and the resins and the colored pigments—all our raw material we buy.

Q. Tell us whether or not from time to time you use new products as they come on the market? A. Oh, yes. I watch the trade journals to see if there is anything new coming up in our field, and when they do, why I try to formulate inks that will give the same approximate consistency to the one we are supplying, and find out if it works better.

Q. And all that has to do with price and so on? A. Oh, yes, price considered.

(735) Q. Tell us how you got into this heat-set ink business. A. To me it was more or less of a natural condition. We had a very good customer in Chicago who we had sold ever since we have been in business. In fact, if it was not for their business, why, we would have had a much harder struggle getting started. And they equipped a press with heat, and I asked for an opportunity of supplying ink for it. I did not know how we were going to make it at the time, but I knew it was just one more problem that had to be worked on, and we developed an ink that would run on that press.

Q. And the requirements of that ink were what? A. The requirements of the ink were resin, a solvent and a

plasticizer. That constituted the vehicle. Then we had to find the proper color, see which color ground better in the varnish. You may have two different colors and they may flow differently. We had to find that out.

The Court: What do you mean by grind the pigment, you mean the mixing of it?

The Witness: You have to process it. You take the varnish and then you mix it on a chain can mixer, and we mix them up just as they do in a bakery, and that makes a paste out of the varnish and the pigment. From there it goes to the printing ink mill, and in the printing (736) ink mill there are three iron rollers, two rollers turn in, the front roller turns out, and there is an apron on it with a sharp, straight razor-edge blade that scrapes it off, and it falls into a can below. That operation may be repeated two, three, four or five different times, according to the hardness of the pigment.

The Court: And that roller grinds the pigment?

The Witness: That roller grinds the pigment.

The Court: What is the condition of the pigment when it starts through that machine, is it a powder?

The Witness: It is a sort of a muddy mixture, as if you mixed mud and water together, for the first run.

The Court: I mean when you first put it in the dough.

The Witness: When you put it in the dough it is just powder and varnish thrown on top of it. The powder is spread fine, but it is not fine enough to run on a printing press.

Q. What were the physical requirements of heat-set ink for its operation on the press, for example? A. It had to set and dry after passing through the heater on the press.

(737) Q. How about during printing and on the roller, what was it supposed to do? A. The ink was supposed to

be stable enough so that it did not evaporate before it went through the oven.

Q. You mentioned oven; what kind of an oven did they have on that first press that you saw? Hall was the name of the customer you had reference to? A. The name of the customer I had reference to was the W. F. Hall Company in Chicago.

Q. Please describe the heater you saw on that first press? A. The heater was sort of a box with a slit at the entrance and a slit at the end, through which the web of paper ran, and it ran through the heater after printing the first side, and there was a second heater through which it ran after printing the second side of the sheet.

Q. How was that heater heated? A. It had a gas burner for it.

Q. Was it pretty hot? A. Very hot. I would not go near it.

Q. In the development of heat-set inks when was it that you saw that first press that you have described? A. In the early part of 1938.

Q. Where did you get the material from which the solvent, for example, and the resins, were made? (738) A. I tried what material I had in my own plant first. We had the resin there. I tried a paraffin oil that we had always used for a good many years, and I found it was not quite satisfactory. So as the oil salesman came in I asked him for an oil that would do that kind of work.

The Court: Do what kind of work?

The Witness: To evaporate after it passes through the heater and to evaporate completely, cleanly.

The Court: Was it necessary to make these inks dry?

The Witness: Yes.

Q. You say you asked the oil salesman; what happened after that? A. They put in samples and I made up varnishes from the solvents they sent in.

Q. With those varnishes what did you do? A. I ground the pigment in them. I worked on a four-color process, ground yellow in the heat-set varnish, then red, then black and then blue.

Q. Did you try those inks out on the press? A. Yes, I did.

Q. How long after you saw the press in 1938 was that? A. Oh, I imagine it was about a month.

Q. Have you tried out those inks? A. Yes.

Q. And how did they work on that press? A. I was (739) satisfied that I had made progress, but they were not satisfied enough. So I went back to the plant and made corrections, which were very successful.

Q. Are those corrections that are commonly made or not with all inks? A. We always make corrections to suit the paper stock.

Q. Did you ever hear of Magie Bros. Petroleum Products Company? A. Yes.

Q. I show you some invoices, which are here in evidence as K-1, K-2, K-3 and K-4, inclusive, and ask you whether that is your company whose name appears as the addressee? A. That is.

Q. And that oil was used in what inks? A. In our heat-set inks.

Q. For what customer? A. Crowell-Collier.

The Court: What is the date?

Mr. Free: January 1941.

Q. Tell us whether or not you have been making and selling heat-set inks ever since that first experience with Hall in 1938?

The Court: He has not fixed any dates at all.

Mr. Free: Yes, he said he made the first ink for Hall in 1938.

Q. (Read.) A. Yes.

Q. I show you a Montgomery-Ward catalog section which (740) is here in evidence as Defendant's Exhibit F-1, and ask you if you ever saw that before? A. I have.

Q. Tell us what you know about it.

Mr. Byerly: I object to further evidence on this until the defendant meets your Honor's requirement that we be provided with samples for the analysis of the inks with which this was printed. This is of the nature of an ex parte test, and no information as to what was printed was furnished us.

Mr. Free: The inks will be in in about five minutes.

The Court: Have you got them in the court-room?

Mr. Free: Yes.

The Court: Objection overruled.

Q. I ask you to tell us what you know about that F-1 exhibit. A. We made these printing inks up according to the McElroy patent, which consisted mainly of three ingredients, in fact entirely of three ingredients. We adhered to those three ingredients in making the formula. We made up approximately 300, 250 to 300 pounds, brought it up to the Hall plant and put it on the printing press. We adjusted the consistencies for trapping purposes.

Q. Tell us what you mean by trapping? A. The first color printed is usually yellow, then comes red and then (741) either black or blue. The first color has to have a consistency, pasty and tacky enough to take the next color. Then the third color has to be a little softer than the second and the fourth the softest of all to get good trapping conditions. Otherwise you would get sort of a blur on purples with the red and blue mixed together.

Q. Will you go on with your story and tell us what you did with the inks according to your personal observation, at Hall's? A. We added a little more of the solvent called terpineol.

Q. Why was that done? A. We had to soften up the colors to trap better, and we also had to soften them up so that it did not pull the paper, otherwise if it is too tacky you would just pull the hide off the paper stock.

The Court: You mean it sticks?

The Witness: Yes, if you put your finger down in the ink and lift up your thumb, it sticks. The action on the press is just the same, it pulls the coating off the sheet.

(742) The Court: What does that do, create a vacuum or sticking effect?

The Witness: Well that shows your condition of the paper stock. If it is so soft that the finger could pull it off, then you have to be very careful on the press and soften up the inks for this. As a rule this paper stock is heavy, so that that does not happen.

The Court: Is the pressure of the printing roller on the paper very heavy or very light?

The Witness: It just gives it a kiss impression, just to print, with enough pressure to print, to place enough make-ready to force it up to the paper and keep the solid solid instead of just fuzzy.

Q. I think you are using terms we may not know. What do you mean by "make-ready"? A. Well, I am not a printer, but I know the printer uses some make-ready on the press to help the printing condition of the plate, to make the relief figure stand out.

Q. This circular which you have before you, Defendant's Exhibit F-1, tell us whether or not you actually saw that printed, come off the press? A. I was there at the start and at the finish. It was on the press a couple of hours. Then we ran down on the amount of ink, and instead of keeping the fountain filled up we stopped.

(743) Q. During that run did you notice the condition of the ink in the fountain? A. Yes, I did. It still looked the same as after it had been adjusted in the beginning.

Q. Did you notice whether or not there was any drying of the ink on the roller? A. If there were drying I did not see it. The press ran, and if there was drying on the rollers that press would not run. Those rollers would powder it so that you would not get an impression from the color that dried.

Q. What was the condition of the ink on those folders, Exhibit F-1, as they came off the press? A. Of the folders?

Q. Yes. A. There was no ink on the folders.

Q. Well state whether or not the ink was dry or wet as they came off. A. Oh, it was dry as it came off the press; the paper was dry.

Q. Now I notice the signature "Roy Carroll" on that Exhibit F-1. Is that your name (indicating)? A. That is my signature.

Q. And you signed it on what day? A. November 18, 1942.

Q. There are other names on there——

The Court: What is that date, the date of the printing?

(744) The Witness: The date of the printing.

The Court: And what is that date again?

The Witness: November 18, 1942.

Q. There are some other names on that Exhibit F-1. Were those put on in your presence? A. They were.

Q. I show you an invoice dated November 18, 1942, from Sinclair & Carroll to W. F. Hall Printing Company, and I ask you what that is, if you know (handing to witness)? A. This receipt covers the heat-set printing ink which we supplied to Hall, and which were run on this job.

Mr. Free: I offer in evidence as Defendant's Exhibit A-2 the receipt identified by the witness.

Mr. Byerly: Your Honor, I object on the ground that it gives no information as to the composition of the inks.

The Court: As to what?

Mr. Byerly: The composition, what the inks were made of. It has symbols of one kind or another.

The Court: Well this proves that it was sold and used.

Mr. Free: This merely shows that certain inks were sent to Hall on that day. That is all it is intended for.

(Marked Defendant's Exhibit A-2.)

The Court: What is the date of that one?

Mr. Free: November 18, 1942.

(745) Q. Will you tell us, Mr. Carroll, whether or not this receipt, Defendant's Exhibit A-2, referred to the ink with which Defendant's Exhibit F-1 was printed? A. It refers to the inks.

Q. Do you have with you samples of those inks as actually used to print Exhibit F-1? A. I have (producing).

Q. You have produced four metal cans marked "Sinclair & Carroll Company, Inc.", dated 11/18/42, and I ask you whether those are the cans which contain the ink with which Exhibit F-1 was printed? A. They are.

Q. Will you tell us whether or not you saw these cans filled? A. I saw them filled.

Q. And what ink was put in these cans? A. The printing inks that were sent up to Hall's for printing this signature.

Mr. Free: Exhibit F-2. The witness referred to Defendant's Exhibit F-2.

The Court: F-2—both cans are the same?

Mr. Free: The four cans are the same, but he refers to the printing of this circular.

Mr. Byerly: Isn't it Exhibit F-1?

Mr. Free: Yes, F-1, I should say. I mark these four cans for identification, the first can as Defend-

ant's Exhibit B-2, marked "Rotary Yellow, 1st Down, No. 20805."

(746) (Marked Defendant's Exhibit B-2 for identification.)

Mr. Free: The second can marked "Rotary Red, Second Down, No. 20806", as Defendant's Exhibit C-2 for identification.

(Marked Defendant's Exhibit C-2 for identification.)

Mr. Free: As Defendant's Exhibit D-2 for identification the can marked "Rotary Black, Third Down, No. 20807."

(Marked Defendant's Exhibit D-2 for identification.)

Mr. Free: And as Defendant's Exhibit E-2 for identification the can marked "Rotary Blue, 4th Down, No. 20808."

(Marked Defendant's Exhibit E-2 for identification.)

Q. Now just to connect them up, Mr. Carroll, tell us whether or not these four cans have been in your presence ever since you put the ink in them? A. They were, up until the time I left Chicago.

Q. Now I show you five formula cards entitled "Production Order", four of them being dated 11/5/42 and the fifth dated 11/3/42, and I ask you what they are if you know (handing to witness)?. A. They are the formulas (747) for the printing ink as printed on Exhibit F-1.

Q. And as contained in these four cans? A. And as contained in those four cans.

Q. Tell us whether or not the ink in these four cans and shown on those cards was made up in your presence? A. It was.

Q. And these cards are from your files? A. They are from our files.

Mr. Free: I offer in evidence as Defendant's Exhibit F-2 the card dated 11/3/42 entitled "Heat-Set Varnish No. 20798."

(Marked Defendant's Exhibit F-2.)

Mr. Free: And as Defendant's Exhibit G-2 the formula card dated 11/5/42 and marked "Rotary Yellow, 1st Down, No. 20805."

(Marked Defendant's Exhibit G-2.)

Mr. Free: And as Defendant's Exhibit H-2 the formula card marked "Rotary Red, 2nd Down, No. 20806", dated 11/5/42.

(Marked Defendant's Exhibit H-2.)

Mr. Free: As Defendant's Exhibit I-2 the formula card dated 11/5/42, marked "Rotary Blue, 4th Down, No. 20808."

(Marked Defendant's Exhibit I-2.)

Mr. Free: And as Defendant's Exhibit J-2 the formula card dated 11/5/42 marked "Rotary Black, 3rd Down, (748) No. 20807."

(Marked Defendant's Exhibit J-2.)

Q. I notice that in four of these cans for the four-color inks each refers to No. C20798 varnish. What is that? A. That is the heat-set varnish made according to the McElroy patent.

Q. Do you have a formula for that also? A. Yes, I have.

The Court: Is that a varnish?

Mr. Free: Yes, your Honor.

Q. And what is that formula? What card is it on? A. This is on one of our standard production orders.

Mr. Free: The witness refers to the card, Exhibit F-2.

Q. Now, Mr. Carroll, I wish you would open one of these cans—take Defendant's Exhibit E-2 for example—and show the Court the ink which is in it. A. I would like to, but I believe there is an opener on your desk.

Q. Here it is (handing witness). A. (The witness opens can and demonstrates to the Court.) It is very gooey stuff, more like heavy molasses.

Q. And was that particular ink, Defendant's Exhibit F-2, used without change on the press when Defendant's Exhibit F-1 was run—the folder? A. F-1—what are you referring to, exhibit numbers?

Q. This circular. A. This ink was used on this (749) circular.

Q. Without change?

The Court: As they came out of the cans?

The Witness: Well I had to add a little more solvent, to adjust it to the press.

The Court: That thins it a little?

The Witness: That thins it a little.

Q. You made it thick first? A. I made it thick in the beginning because we always, before we start a job, make it as heavy as the paper could stand. I had a fair idea of what it could stand, so I made it heavy at first and softened it down after it ran on the press. It ran a couple of hours that way.

Q. What was the thinner you put in the fountains? A. Terpineol.

Q. And you brought a can of that with you? A. I brought a can of that with me.

The Court: Is that a solvent?

Mr. Free: That is one of the McElroy solvents, your Honor.

Q. When you thin an ink in the fountain how do you go about it? A. I take an ink knife, a long ink knife, take the can of solvent and pour it in, just so much, and watch the consistency as I pour it in so that it (750) gets nice and free-flowing.

Q. Do you measure the solvent that you put in or do you put in just enough to get the right consistency? Which is which? A. We should measure—we have an idea of what we are putting into it, of course. We take a container, as a rule, like an open can, either fill it or half fill it, and pour it in.

Q. Do you have any idea how much of that solvent terpineol you put in these ink fountains after that? A. Yes. I should say it ran between one and one-half per cent on the yellow and perhaps about three-quarters of one per cent to one per cent on the red, blue and black.

Q. How much terpineol did you have with you? A. About eight pounds.

Q. How much of it did you use in these inks? A. I used most all the eight pounds.

Q. Now I would like to show you a Montgomery-Ward Christmas book of 1942 and ask you whether you ever saw any part of it before (handing to witness)? A. Yes, sir. I have seen this part here (indicating).

Q. What pages are you referring to? A. Well, the pages vary according to the different signatures. This signature is different from our exhibit here because it was made for a different private mail order house.

(751) Mr. Free: The witness refers to Defendant's Exhibit F-1.

A. (Continuing) It is this hobby horse here—and the toys (indicating).

Q. Tell us whether or not you saw that one printed, the one I have given you (handing to witness)? A. I saw this job printed a couple of weeks before we sent our inks in on the test, on our exhibit here.

Q. Do you know whether or not this catalog page you have just referred to was run with this same ink shown in Defendant's Exhibit F-1? A. This is a different ink from our exhibit. I don't know whose ink this is. The Hall Company would know. It was their standard, whatever it is.

The Court: In other words, that Christmas catalog—what exhibit number is that?

Mr. Free: I was about to offer it. This Exhibit was not run with McElroy, and I will offer this one.

The Court: You did not supply the ink for that?

The Witness: I did not.

Mr. Free: I will have this marked KK for identification, with particular reference to page 59.

(Marked Defendant's Exhibit KK for identification.)

(752) Mr. Free: These four cans of ink which were heretofore marked for identification as Defendant's Exhibits B-2, C-2, D-2 and E-2 I will offer in evidence at this time, with the same letters that they now bear.

(Defendant's Exhibits B-2, C-2, D-2 and E-2 for identification received in evidence.)

Q. Still referring to these inks, Defendant's Exhibits B-2, C-2, D-2 and E-2, that is, the cans, would you from your experience call that a modern heat-set ink? A. I would call it a heat-set ink.

Q. How does it compare— A. Fairly modern.

Q. How does it compare with the inks you have made more recently and sold? A. Oh, of course——

The Court: You are asking him what?

Mr. Free: To compare this old ink made up for Montgomery-Ward with the new inks.

A. I think the newer inks—we know what they are and know how they have been running. They run very well, and this (indicating) runs somewhat similar to them but not as good.

Q. That is, you have— A. We have made improvements on them.

Q. What improvements? Are those in the nature of additions to the ink? A. Well, I would call them additions to the ink, yes.

(753) Q. What, for example? A. Well, to make a better heat-set ink than contained in the McElroy patent, why I would possibly use one of the hydrocarbon solvents that we use today in preference to terpineol.

Q. Do you know whether that is cheaper or more expensive than terpineol? A. It is much cheaper than terpineol. Terpineol is very expensive.

Q. What do these modern inks contain in addition to different solvents? A. Plasticizers.

Q. And what would that be? A. Well, I would call it the vegetable——

The Court: What do you use instead of terpineol, a cheaper what?

The Witness: A hydrocarbon or kerosene oil class.

The Court: Would you say a hydrocarbon solvent?

The Witness: I would.

Mr. Free: Yes. It is this Magie high boiling kerosene compound.

Q. I notice in your answers to the interrogatories you mentioned that the accused inks contain wax and grease,

for example. What do they do? A. That increases their stability. It helps them to remain open on the press. There is a lot of friction with that roller turning over so quickly, and that increases the stability (754) of the ink.

Q. I also notice in the answers to these interrogatories that you mention that the accused inks contain perilla oil, linseed oil. What do they do? A. Well, I had to melt the resin in something. I could not melt it in the solvent because that would evaporate, so that is why we have what we call a plasticizer. We melt the resin in there and cold-cut it with the hydrocarbon oil.

Q. By "cold-cut it" you mean you take it when it is cool— A. Take it off the fire and add a solvent.

Q. Tell us whether or not you use driers in the more modern heat-set inks?

The Court: Use what?

Mr. Free: Driers, your Honor.

A. Sometimes it is necessary but not all of them have a drier.

Q. Now after you began making these heat-set inks did you have any information as to what vapor pressure the solvents had? A. It was a mystery to me what vapor pressure was until I studied hard. In coming down to New York for the first time I really got it clear in my head what vapor pressure was. We never bought things by vapor pressure.

Q. When did you first find out, if you ever did, what the vapor pressure of this 502-C oil is that you (755) use in your inks? A. Only recently.

Q. How did you go about finding that out?

The Court: He did not testify anything about using 502-C oil.

Mr. Free: I believe it is agreed that these accused inks contain 502-C oil. That is shown in the invoice in evidence.

The Court: Is that what he means by the kerosene that was used?

Mr. Free: Yes.

The Court: The 502-C oil?

Mr. Free: Yes, your Honor, the 502-C oil.

Q. How did you find out what the vapor pressure of this 502-C oil is? A. I called up the company that supplied it and asked them what it was.

Q. Is that Magie? A. That was the Magie Company.

Q. How long ago was that? A. Not very long. It was about—oh, some time in December, about the first week or second week in December. Maybe it was November—I forget—November or December.

Q. Of what year? A. Of 1942.

Q. So that as we have it now you did not know anything about the vapor pressure of the oil used in the accused inks until December 1942? A. Absolutely no.

Q. Mr. Carroll, I want to ask you whether from (756) your experience this can of blue ink, Defendant's Exhibit E-2, which you have opened, is still in pretty good condition? A. Very good condition.

Q. I wonder if you would demonstrate to the Court how the ink is evaporated by heat. A. I could if I had a little sheet of paper and could make a draw-down on it.

Q. Will you please do so? A. Have you the little knife there on the table?

Q. Yes (handing to witness). A. (Demonstrating.)

Q. Will you please describe what you are doing? A. I am making a draw-down which will show the color.

The Court: Tell us what you have done: "I have taken some of the 502-C"——

The Witness: I have taken some of the 502-C——

Q. No. A. —or rather ink. The ink is ground in this. It has a number, 20808.

Q. Let us call it Exhibit E-2. A. E-2.

Q. And you are placing it on a piece of paper? A. Yes.

Mr. Freed: I will mark that paper Defendant's Exhibit LLL for identification.

(Marked Defendant's Exhibit LLL for identification.)

Q. Describe what you are doing. Now you are taking a knife, are you? A. I am taking a knife and I am going to make a pull-down so that we can distribute that color (757) into a small film. Now, I would like to pass this over a heater. It has to be hot.

Q. Wait until the heater has a little heat there. You are now doing what? A. I am now passing the draw-down of the ink over the heater.

Q. I notice smoke coming off of the paper, what is that? A. That is the 502 oil coming out of the solvent.

Q. You keep calling it 502 oil; is that what you mean? A. That is the heat-set blue.

Q. The solvent? A. Or solvent.

Q. What is the solvent? A. The solvent happens to be the 502-C oil.

The Court: It is the solvent that passes off as a smoke?

The Witness: Yes, your Honor.

Q. I asked you what the solvent is in the ink which was taken from Exhibit E-2. A. 502-C—oh, wait a minute, I am confused. I beg your pardon, this is the terpineol solvent and this is part of the exhibit. I was confused on that. No, that is the terpineol.

Q. Will you show us whether or not the ink on Exhibit LLL for identification, which I now offer in evidence, is dry or not? A. This is dry. Passing your finger over it you cannot rub it off. That is set.

The Court: That was not the ink you intended (758) to use for this experiment?

The Witness: This is the ink. This is the terpineol solvent ink. I was confused when I referred to the 502 then.

The Court: That is the butyl?

Mr. Free: No, this is the McElroy patent ink.

Q. I notice that paper, Exhibit LLL, is a little charred. A. That is from the heat. You have not enough distributed heat there. In passing it through a printing press it goes very fast and it will dry much better on the printing press than it will from this simple little operation. This is the nearest approach to it. The heat is not uniformly concentrated on that.

Q. Does that charring make any difference in the drying qualities of the ink? A. It would make it dry better.

Q. That is, the hotter the ink the better it dries? A. That is correct.

The Court: But you cannot use a heater that chars the paper, can you, in actual practice?

The Witness: You cannot use a heater that chars the paper, but the paper has to run through so fast that it won't char it.

The Court: But if it does char it, the heat is no good?

The Witness: If it does char and you cannot (759) get any better results than that, then it would be no good.

The Court: It would not be a successful operation if the paper came out charred?

The Witness: No, sir, it would not.

Q. I do not want to ask you to demonstrate the heat-drying properties of these other inks in Exhibits B-2, C-2 and D-2, but can you tell us whether or not they would act the same? A. They would.

Q. Now, I show you a container, marked Sinclair & Carroll Company, Inc., Defendant's Exhibit V, and ask you

what that is, if you know? A. That is our solvent for the heat-set inks we are running today, or have run in the past.

Q. That contains what? A. Just the hydrocarbons or kerosene fractions.

Q. Called what? A. Called 502-C oil.

Q. Tell us whether or not you sent a container like that to Mr. Clinton Taylor in Cincinnati? A. I did.

The Court: Did you follow this McElroy patent in making up your ink purposely?

The Witness: Purposely I adhered to the three ingredients that were in it.

The Court: Why, did you have a license under that patent?

(760) The Witness: No, sir.

Mr. Free: That patent had expired, your Honor. It was public property.

The Court: But you just looked up that patent and follow it in making up your ink?

The Witness: Yes, but there were corrections on the press where we had the extra solvent, and in the beginning we adjusted the amounts to make suitable consistencies.

Cross examination by Mr. Byerly:

Q. It was in 1938 you made your first heat-set ink? A. Yes.

Q. And you yourself had been in the ink business since around 1913, is that right? A. Yes, that is correct.

Q. And when you were making linseed oil inks, which you have done a good part of your life if I understand you correctly, will you tell us how you adjust the thickness or consistency of a linseed oil ink? A. We would, if it was too heavy, we would cut it with a reducer, or we might extend it with more soft linseed varnish.

The Court: What is the difference between reducing it and extending it?

The Witness: Reducing it you take a very (761) quick cut like kerosene. You would not use as much, very little, and that thins it down.

Q. But you have linseed varnish of a number of different viscosities or thickness, don't you? A. True.

Q. And you mix a different amount of one varnish or another together to make an ink or put the body you want in? A. Sometimes.

Q. That is the ordinary way of making up a linseed oil ink? A. No two manufacturers make it the same way.

Q. That is, some mix in more of one and some more of another? A. That is right.

Q. Did you furnish the Hall Company with this heater they had on a press in 1938? A. No.

Q. That was already there before you started to make a heat-dried ink? A. I don't know.

Q. Well, you knew they had been using heat-dried inks before they asked you for one? A. They had just put in the heater before I walked in the plant and asked for an opportunity to sell ink on it. That is how I came to ask for the chance.

Q. Of course, the Vaporin heat-set inks were on the market at that time, were they not? A. What inks?

Q. Vaporin. A. I suppose so.

Q. You kept some track of what your competitors were selling, I suppose? A. Not too close a track.

(762) Q. Did you ever see an ink that would set instantly by heat and stay open on the rolls of a typographic press, before 1932? A. I do not know, I cannot remember.

Q. Do you remember when you first saw such an ink working on a typographic press, that is, an ink which stayed open on the rolls and dried instantly by heat? A. My ink was the ink I saw.

Q. You had never seen any ink that worked like that until you made up one, is that right? A. As far as I can remember that was the first I saw the heater. It was in an experimental stage at the Hall plant at the time.

Q. You had never seen any heat-set inks that were being put out by other ink companies before that? A. No.

Q. When you came to make an ink to work in this heater, if I understood you correctly, the first solvent you used, which was one you had in your plant, did not produce a very good ink, is that right? A. No, that is not right. It did not produce an ink good enough for some sheets of paper I had in mind.

Q. Then you called in the Magie Company to try and get a better solvent? A. He was one of the companies that called at the door all the time, and I asked him to put in a sample.

(763) Q. And when he gave you a sample you used that as a solvent in your ink and the ink worked better? A. It helped it a lot.

Q. Do you know whether the Hall Company bought all of their heat-set inks that they used from you? A. They do not.

Q. Who do they get them from? A. I don't know.

Q. Do you know whether they make any themselves? A. I have heard that they did.

Q. You have heard that they make their own heat-set inks? A. And I have also heard that they buy heat-set inks that are not ours.

Q. Now, these sample inks you made up and tried at Hall's were made for the purpose of getting evidence for defending this suit, were they not? A. I suppose so.

Q. Well; you knew that perfectly well, didn't you? A. Yes.

Q. Hall knew it too? A. I do not know anything about Hall.

Q. Hall did not charge you anything for trying these inks, did they? A. I cannot remember whether we received an invoice yet or not.

Q. Did they pay you for these inks? A. I did not bill them for them.

Q. What was this invoice you put in evidence? A. That (764) was the receipt.

Q. That was not a bill? A. No, that shows the ink was received.

Q. But the ink was billed, as I understand it? A. No.

Q. Was it you personally that formulated this varnish referred to on Exhibit J-2? A. You mean did I write that production order out?

Q. That is right. A. No, I had my foreman write it out.

Q. Apart from who wrote it out, who formulated it, who decided how much of these different things to put in? A. I had received a copy of part of the McElroy patent from Mr. Taylor, and he gave me the amounts according to the patent, and I had to vary those to make a printing ink that would run successfully at the present-day speeds. I adhere strictly to the three ingredients in the formula.

Q. But you changed the proportions very widely, didn't you? A. I changed the proportions.

Q. For instance, you remember finding in the McElroy patent Cumar P-25? A. I cannot remember the patent, whether it had a number or not. I do not think it had a number.

Q. Are there more than one Cumar resins? A. I have found that out, yes.

Q. How did you find that out? A. Because they had (765) a prospectus with several on it.

Q. Who did? A. The company from whom we bought the Cumar.

Q. Who was that? A. Oh, it is a well known company. I do not remember whether it was Barrett or not. It might be Barrett. I cannot remember now.

Q. You are not sure who it was? A. I cannot remember now.

Q. And you got the prospectus that this company put out in 1942, I suppose? A. I do not know when it was put out. I do not know whether I have the prospectus yet. I

think we destroyed it, because we figured that the present product we were supplying was all right. We had standards.

Q. You used the current prospectus of Cumar resins when you made up this ink? A. I do not know whether it was current or antique. I asked them for samples of their different resins. I did not see the prospectus when I ordered it.

Q. You just asked them for samples of all of them? A. No, the couple we needed.

Q. Why did you decide on those two? A. Because we wanted different melting point resins. Some were harder than others, some were softer.

Q. And you picked out two you thought you would (766) like on the prospectus, which you later destroyed? A. I did not destroy anything. I just don't remember it being around. I cannot produce it for you now, that is what I mean.

Q. Then you picked several Cumar resins from this prospectus and asked them to send you samples? A. I did not pick a couple.

Q. P-25 I suppose is one of those you picked? A. I liked that one better.

Q. And you cannot remember the name of the companies from whom you got that? A. I guess there is only one company that sells it as Cumar resin. I think that is a trademark name.

Q. Yes, but you personally do not remember the name of that company? A. I think it is Barrett.

Q. Looking at the second item on this formula card, F-2, it is pale second run rosin-oil, isn't it? A. That is correct.

Q. Did you find any mention in the McElroy of pale second run rosin-oil? A. Rosin-oil.

Q. Rosin-oil is all you found in the patent? A. That is true.

Q. What led you to pick pale second run rosin-oil? A. We happened to have always used it.

Q. There are several other kinds of rosin-oils, (767) are there? A. I suppose so. We just are limited in the number we use.

Q. Where did you get this pale second run rosin-oil? A. We had it in our inventory.

Q. You do not remember where you got it from? A. No; I don't. That I do not remember.

Q. Where did you get the terpineol? A. It was either duPont or a subsidiary of duPont's.

Q. You used considerably more pale second run rosin-oil than you did terpineol in this varnish, did you not? A. That is true.

Q. You say you saw a copy of the McElroy patent when you made this up? A. No, I did not. I had, oh, a formula sent to me by Mr. Taylor, who said it came from the McElroy patent, and he asked me to make it up that way.

Q. He did not send you a copy of the patent? A. I did not see the patent.

Q. Well now, the patent, that is, the McElroy patent, contains the following statement:

> "As an example of the preferred proportions of the ingredients named, we take by weight 95 per cent terpineol and 5 per cent rosin-oil, and stir until thoroughly mixed."

The Court: What are you reading from, Mr. (768) Byerly?

Mr. Byerly: From the McElroy patent, forming part of Defendant's Exhibit G, page 2, lines 16 to 19.

(Mr. Free hands copy of patent to witness.)

Mr. Byerly: Your Honor, I do not think it is necessary to furnish the witness with a copy of this patent. He has never seen it.

Mr. Free: If you are reading from it I would like to have the witness read with you.

The Court: All right.

Q. That is what the patent says that was handed you, 95 per cent terpineol to 5 per cent of rosin-oil? A. Yes.

Q. On the same percentage basis. When the rosin-oil plus the terpineol were 100 per cent, what was the percentage of terpineol and what was the percentage of pale second run rosin-oil used in the formula given on Exhibit F-2? A. 2 parts of rosin-oil and 1 part of terpineol.

Q. If you put it on the basis of a hundred that would be, say, 66 parts of rosin-oil and 33 parts of terpineol? A. It would amount to the same thing.

Q. Yes, as compared with 95 per cent of terpineol and 5 per cent of rosin-oil in the patent? A. Yes.

Q. The patent says, beginning at line 20 on page 2:

(769) "With 84 per cent of this mixture"—referring to the mixture of rosin-oil and terpineol—"we incorporate 16 per cent of powdered coumarone resin, that is, that known under the tradename Cumar."

What proportion of Cumar P-25 did you incorporate with the rosin-oil and terpineol? A. In this formula it has 176 pounds.

Q. 176 pounds of Cumar? A. Cumar.

Q. How much of the liquids? A. 88 pounds of rosin-oil and 44 pounds of the terpineol.

Q. That makes the Cumar amount to considerably more than half of the varnish, doesn't it? A. A little more.

Q. Whereas in McElroy it is stated that there should be 16 per cent of the powdered coumarone resin and 84 per cent of the terpineol and rosin-oil, is it not? A. Yes.

Q. Do you know why "varnish" is written twice on card J-2 and one number scratched out? A. Because he copied it wrong in the beginning and scratched it out to make it legible.

Q. What was he copying from? A. The varnish formula, which has a number.

Q. You mean he made a mistake in copying from Exhibit F-2? A. The number of the varnish used is (770) C-20798. He had it there and crossed it out to make it perfectly legible.

Q. Looking at your ink formula, J-2, what does that ink contain according to that formula, besides varnish? A. Carbon black and reflux blue.

Q. Is that reflux blue a pigment? A. No, it happens to be a pulp ink flushed in an ordinary oil, linseed varnish. That is a class of toner used in the printing business.

Q. Just tell us what you mean by a flush color? A. We buy it as an ink already made. The firm that sells us this pulp blue does not put it through a drier and extract the moisture. They just leave the powder behind. In the process they substitute linseed varnish or any other varnish they want to, and dry out the water through means of a vacuum or heat, and we buy it in that condition.

Q. Then what you buy is a pigment already dispersed in linseed oil, is that right? A. In this case.

Q. What is the consistency of that flush color, about like a printing ink when you get it? A. It is heavy consistency. It has to be cut down before it can be used.

Q. Then when you added this so-called reflux blue referred to on Exhibit J-2, you added some linseed oil (771) varnish to the ink you were making at the same time you added pigment, did you not? A. A very small amount.

Q. What percentage of this reflux blue is linseed oil, do you know? A. I have no direct knowledge.

Q. What does this symbol 1577 mean? A. That is the identifying number that our supplier puts on it when he sells it to us.

Q. Who did you get this reflux blue from? A. The Standard Ultramarine Company.

Q. How would you use this reflux blue if you were making an old-fashioned oil ink out of it? A. That particular type of blue we very rarely run concentrated. We use that in small amounts as a toner, principally in black inks to give it more depth.

Q. You could make an ink out of it by merely adding some thin linseed oil varnish to it, couldn't you? A. I never tried it.

Q. And you have no idea what percentage of linseed oil it contains? A. No, I don't.

Q. Looking at your formula card, H-2, according to the formula what did that ink contain besides the varnish? A. It has some magnesia and two different red pigments.

(Short recess.)

Q. As I understand it, you made up these inks, referred to on these formula cards, after receiving some (772) kind of instructions or information from the Hilton-Davis Company? A. From Mr. Taylor, who was there.

Q. Were those in writing? A. He had them in a memorandum.

Q. I mean did he give you a memorandum? A. He had a memorandum, yes, that he gave me.

Q. Can you produce that? A. I cannot, I have not it with me.

Q. What did you do with that? A. I suppose that is in the files somewhere.

Q. I see, but you did not bring that in? A. No, I did not.

Q. You do not remember just what it said? A. It just said this is the formula taken from the McElroy patent.

Q. And you do not remember just what the formula was? A. The formula was the same as in the McElroy patent.

Q. You mean it said 95 per cent terpineol and 5 per cent of rosin-oil? A. If that is what is in the patent, it did.

Q. Did it contain any suggestions as to how you should modify that? A. Yes, it said you could modify it to suit your conditions.

Q. It did? A. I believe it did, from my memory.

Q. How long did this printing trial take at Hall's? (773) A. Oh, a couple of hours.

Q. How many times was the press shut down during that couple of hours? A. I do not remember it shutting down once. It ran right ahead.

Q. Then this terpineol you added to the fountains, did you do that while the press was running? A. Not the very beginning. Before we really got started I did that.

Q. But while the press was running? A. Not while the press was running.

Q. Oh, not while the press was running? A. No, you could not do it that way.

Q. What did you do, run the press a little while and then decided you needed a little more terpineol added? A. Just started the web through the press. Then I decided to adjust it so that the inks would not pick the paper coating.

Q. They would not pick the paper coating unless they got pretty thick on the ink rolls? A. When you start a press in the morning and it is cold, any ink will do that.

Q. Then did you add this terpineol to all three of the inks? A. All four of the inks right on down the line, so as to keep my consistency the same.

Q. These samples you have got, are those samples you (774) took out of the fountain at the end of the run? A. I took those out of the ink before it was delivered to the W. F. Hall plant.

Q. You did not keep any samples of what was left in the fountains? A. No, I did not.

Q. There was some left in the fountain? A. Naturally.

Q. That was just thrown away, as far as you know? A. That is true.

Q. You did not use it all up? A. No, you have to keep the fountain fairly full in order to print, to force it down to fit.

Q. Then you just took that out and threw it away? A. I had nothing to do with it.

Q. Do you know what kind of paper this was printed on? A. The same kind of paper stock I believe that the regular Christmas flier of Montgomery-Ward's is printed on.

Q. Was this the kind of paper you had supplied ink for before? A. Similar papers all the time.

Q. But, as I understand it, Hall had not been printing this catalog with your ink? A. No, they had not.

Q. And you do not know where they got the heat-set ink they were printing it from? A. No, I do not know where they got the ink they printed it with.

Q. When you got these instructions from Mr. Taylor you knew he was going to act as expert in this case, did (775) you not? A. I knew he was, yes.

Q. Were his services as expert contributed by the Hilton-Davis Company? A. I suppose so.

Q. You have not paid him anything? A. No.

Q. You have had other contributions towards your defense, haven't you? A. Yes.

Q. Any from the Half Company? A. No.

Q. But they ran this run without charging you? A. They may have a bill in yet, I don't know.

Q. But you know you have not paid them anything? A. That is true.

Q. Referring again to this McElroy patent and the notice on page 2 at line 21, there is a reference to powdered coumarone resin, you see that, don't you? A. Yes.

Q. Now, did you add this resin, referred to on your formula card as coumarone P-25, in the form of a powder? A. Well, it is very sticky, like a ball of very hard wax, giving with a little elasticity.

Q. Was it in the form of a powder? A. We tried the powder too, but we liked that better.

Q. You mean the powder was a different coumarone resin? A. No, it is the same kind of resin, only it is in a little different form.

Q. That is, this P-25 does not come in powdered form? (776) A. No, that is not powdered. That is more or less of a sticky, waxy substance.

Q. You referred to having a catalog of coumarone resins, I think you said it was from the Barrett Company you thought? A. Yes.

Q. I show you a so-called Cumar specification chart, forming part of the Cumar catalog of the Barrett Company, did you have that chart before you when you were picking out the resins? A. This looks like something I have seen; very similar to it.

Q. Now, on that chart there is a mention of P-25, and under the column "Formula", P-25 is referred to as viscous, is it not? A. That is correct.

Q. And this P-25 you got from the Barrett Company was viscous, wasn't it? A. As I have described it.

Q. You say you also tried some powdered coumarone resin? A. Yes.

Q. You did not like that as well? A. I thought the other would make a better printing ink from my ink maker's viewpoint.

Mr. Byerly: I ask the clerk to identify the chart shown to the witness.

(Marked Plaintiff's Exhibit 38 for identification.)

(777) *Re-direct examination by Mr. Free:*

Q. Mr. Carroll, you were asked some questions about consistency of inks, can you tell us whether the consistency of the four colors differs one from the other? A. Oh, yes, sir.

Q. Why? A. Because they have to trap. The first color laid down on the sheet has to have enough tack to pick up the next color.

Q. Is that the stickiest, the first color? A. The first color is the stickiest.

By the Court:

Q. One color is put on top of the other? A. One color is put on top of the other.

Q. In the same operation? A. In the same operation, in four-color printing.

Q. What is the first color you use? A. Generally yellow.

Q. The whole figure is yellow, and on top of that is another color you do not want yellow? A. On top of that you may want the red to give you the oranges. Then on top of that comes, say, the blue to give the navy blues and the violets, and the black may be run third down or fourth down, and that is put on for the detail, to bring out the more contrasts.

Q. Are those colors on standard rolls that follow each after each other?

(778) Mr. Free: Yes, sir.

(Discussion off the record.)

The Court: After the first cylinder is through then it is all blue or one color, and then on top of that it is modified by putting the other colors on top of that blue?

Mr. Free: Is that right?

The Witness: You first print yellow and you print red on it. You cannot see it because they are all closely together in the press, but if you took the sheet out after printing two colors you would find sort of an orange effect, and then after you printed yellow, red and blue you would find green, violet and navy blues.

The Court: According to what the ink was printed over, what was put on over?

The Witness: That is correct.

By Mr. Free:

Q. But these consistencies, Mr. Carroll, are varied? A. You have to vary.

Q. The first one down is stickier than the last one? A. The last is the softest and in between comes your two modified consistencies, the red a little softer than the yellow, and the blue a little softer than the red.

The Court: You say if you put a red on top of a (779) yellow you get orange?

The Witness: That is true.

The Court: Supposing you do not want orange?

The Witness: Then you do not have it in the color plate. They etch that out in the color plate and leave it clear.

The Court: Leave the paper free?

The Witness: Yes.

Q. How is the difference in the consistency between the different colors obtained? A. You have to use a little more resin in your varnish, as a rule, because that is because you take the heavy consistency, you certainly won't get the heavy consistency from a solvent.

Q. I want to ask you one more question. Have you ever used butyl carbitol in any of your commercial inks? A. I never sold any ink with butyl carbitol in it.

Q. You were asked about this second run rosin-oil; how long have you been using that in your business? A. Ever since we have been in business, for about, oh, 20 years.

Q. Now, these driers, I think it might be a little confusing as to what their function is in ink, what do they do? A. Well, in some cases driers are not necessary and in

other cases you may think they are necessary and put it in there thinking it is going to help the drying (780) condition.

Q. Something like the driers they put in ordinary paints? A. I do not know what they put in paints, but it probably has some relationship.

Q. You were asked about the amount of linseed oil and reflux blue referred to on Exhibit I-2; do you have any notation at all as to how much liquid of any kind is in that reflux blue? A. Oh, a very small amount, just enough to make an ink, possibly about half the amount of reflux blue in it.

Q. It is pretty thick, is it? A. Yes, it is very thick.

Mr. Free: I have here a notice to plaintiff to produce the original letter, which I will give to the clerk to file and a copy to Mr. Byerly. I am asking for a letter which I understand was written by the Carbide & Carbon Chemicals Corporation dated February 8, 1928 to Cray-Finne, mentioning butyl carbitol. Cray & Finne, as you remember, were bought out by the plaintiff here, and this letter ought to be in the old files of Cray & Finne.

---

(781) Raymond A. Kerley, called as a witness on behalf of the defendant, being duly sworn, testified as follows:

Direct examination by Mr. Free:

Q. Where do you live and what is your occupation, Mr. Kerley? A. 807 South Clarence Avenue.

Q. That is Chicago, is it? A. Oak Park, Illinois.

Q. And what is your occupation? A. I am a printing ink maker.

Q. With whom? A. W. F. Hall Printing Company.

Q. That is Chicago? A. Chicago, Illinois.

Q. Do you know anything about the printing business? A. A little bit.

Q. Have you ever been a printer? A. Yes.

Q. Tell us something about your experience in printing. How long have you done that kind of work? A. Well, I have been doing printing ever since I was 13 years old. That started around 1910, in various plants, some in New York State, but mostly in Chicago. I have been with various plants like Manz Engraving Company, the American Colortype Company—those are all Chicago houses—and Cuneo Corporation.

Q. Cuneo is one of the largest printers in the country, isn't it? A. That is right.

Q. How long have you been with Hall? A. Five years.

(782) Q. How large is Hall? A. They are one of the largest.

Q. What sort of printing does Hall do? A. A general line of magazine, mail order and a general line of commercial printing.

Q. Do typographic, rotogravure and so on? A. Well, W. F. Hall does typographic only. The subsidiary Rotoprint does the gravure—Chicago Rotoprint.

Q. And how far apart are those plants? A. Four blocks.

Q. Do you have occasion to go from one plant to the other? A. Occasionally.

Q. You spend most of your time in which plant? A. W. F. Hall.

Q. That is the typographic plant? A. Right.

Q. Have you ever had any of these heat-set inks in your plant? A. Yes.

Q. Where did you get them from? A. I make most of them.

Q. Have you purchased them from any other sources? A. Yes.

Q. Name those, please. A. Why, we purchase from houses like Sigmund & Ullman Company, Sinclair & Carroll Company, the American Printing Ink Company and the

International Printing Ink Company. That covers the field pretty well so far as large operators are concerned.

(783) Q. What sort of presses are those inks used on? A. Why, they are used on the Goss type and the Cottrell—well, they are mostly Goss presses. We have a few Scott presses. That would cover the press angle pretty well.

Q. Great big things such as shown on Plaintiff's Exhibit 14, are they not (indicating)? A. That is right.

Q. Is that in general what they are? A. That is the general setup.

Q. The web comes out and is printed? A. Yes.

The Court: What makes that web go through? Is it pulled from the far end?

The Witness: The press pulls them through the impression cylinders, the plates that are pressing against what we call the backing cylinder where it gets the impression. Then it is also helped pulled through by the folder at the extreme end.

The Court: At the extreme end?

The Witness: Yes.

Q. It is like being pulled through a clothes wringer? A. Yes, a similar thing.

The Court: It is pulled from the far end or the beginning?

The Witness: At the beginning.

(784) The Court: In the beginning it is pushed in?

The Witness: Well, it is pulled in.

The Court: How many of those rollers are in the machinery? How many of them really make the press turn?

The Witness: All of them. They are all different cylinders, all geared in.

The Court: All geared in?

The Witness: Yes.

Q. There is a great big gear box at the end and they are all connected? A. That is right. They are all gear-driven.

Q. On all these heat-set presses the ink is applied to the paper, as I understand it? A. That is right.

Q. And then it is dried by heat? A. That is right, high pressure heaters.

Q. What happens to the ink when you dry by heat? A. Well, it volatilizes off going through this high pressure heating and becomes dry.

Q. You suck off the vapors? A. That is right.

Q. And then it passes over a cooling cylinder? A. Yes.

Q. What does that do? A. They merely cool the sheet down to prevent the succeeding impressions from becoming hot. In other words, the sheet has to be (785) cooled so that the succeeding colors are not affected by heating up the plate cylinders and breaking down the viscosities of the various inks.

Q. When did you first begin using heat-set inks that you said you bought from International Printing Ink Corporation? A. Well, I would say in the last two years we were able to successfully run some of their types.

Q. Were you able to successfully run their heat-set inks prior to that? A. Well, we have had that on—we have had trouble—in fact we have had trouble with the various companies.

Q. Were you ever able to make I.P.I. heat-set inks run prior to two years ago? A. Well, not so good, no.

Q. What happened? A. Well, there was quite a tendency to pile and perhaps the setting-up actions in the earlier stages prevented good trapping.

Q. You used the word "pile". We do not know what that means. A. Well, in other words, if an ink, as you explained here, had a tendency to volatilize too fast, the solvent would get out while that press was in motion at high speed, you would naturally lose your proper viscosity and pulling or carrying action of the vehicle.

(786) Q. Where would that evaporation take place? A. Well, on the rollers.

Q. And you found that to be the case with the I.P.I. ink? A. I found that to be the case with several of them.

Q. Including I.P.I.? A. Including I.P.I.

Q. What happened when the ink dried on the rollers in that way? A. Well, you could not print. I mean you could not print properly.

Q. What did you do in that instance? A. Well, we would have to get a hold of the people involved and try to get them to straighten themselves out through manipulations of whatever they thought was necessary.

Q. Did the I.P.I. ink man ever come in to manipulate it? A. Yes.

Q. What would he do? A. Oh, he would add various thinners or carrying vehicles.

Q. Do you remember any particular instance where that was done? A. Well, so far as date is concerned I would not be able to put my finger on the date, no.

Q. Do you know any instance at any date? A. Yes.

Q. Will you describe what happened? A. Well, they perhaps helped themselves to a great degree by bringing in a service man to manipulate the various colors to get the press running properly.

Q. Did they put a solvent in the fountain to thin (787) out the ink? A. Well, I would not know what they used. I was not interested.

The Court: As I understand it, it is only during the last few years that you have been able to use these inks satisfactorily?

The Witness: Yes, the last couple of years.

The Court: You have had trouble?

The Witness: Yes.

Mr. Free: That is I.P.I. inks, your Honor, the International Printing Ink, plaintiff's ink.

The Court: Is that the only one you have had trouble with?

The Witness: No, we have had trouble with other houses.

The Court: No distinction between the I.P.I. and the others?

The Witness: No.

Q. What is the first good heat-set ink that you saw or used? A. Well, I don't like to brag but I did a pretty good job myself.

Q. When was that? A. Why I started it, I think, around the latter part of 1937, and of course I had my troubles as well as everybody else has in getting them organized to manipulate properly. I would say in the last four years we have been quite successful with our own setup.

(788) The Court: You mean the ink you made yourself?

The Witness: That is right, your Honor.

Q. How about the Sinclair & Carroll Company ink? How did that ink work? A. Well, we had the same trouble, the same as mentioned with other houses, but he finally got straightened out like other people have.

Q. As I understand it, these webs, after the ink is applied, go through heaters? A. That is right.

Q. How hot are they? A. Well, we have measured to a degree as possible; they go from the tip of the flame, from 1700 to 1900 degrees of heat, but on the traveling web I would say they don't take over 350 to 400 degrees of heat.

Q. How close is the web to the gas flame? A. About an inch.

Q. It passes down right in front of the gas flame? A. That is right.

Q. They are arranged in a sort of a bank, aren't they, the gas flames? A. Well, depending on the construction of

the machinery. It doesn't make any difference how they have that oven in there.

Q. Do you know whether or not the advent of a good oven had anything to do with the success of heat-set inks? A. I would say without an oven you could not run any of them.

(789) Q. When was the first good oven that you know about put into operation in your plant? A. About 1937. Previous to that—or rather around the same time I think on one of the big units we put in 32 gas burners of our own in our experimental work.

Q. That is, you took a standard press and put heaters on? A. That is right.

Q. And it wasn't until later that you got a successful heater? A. That is right, high pressure type.

Q. And that, you think, has largely to do with the success of these inks? A. Yes, I think so.

Q. Now I show you a Montgomery-Ward folder which is marked in evidence as Defendant's Exhibit F-1 and ask if you ever saw that before (handing to witness)? A. Yes, I am familiar with it.

Q. Can you tell us what you know about it? A. Well, we made a test run. I think the date is on here—11/18/42. This is my signature on here. Those inks were put in a run in the same manner as we would any other type of heat-set ink, and the difficulty of starting up was no more than any other type on a cold press. We have to dope all our inks on a cold press.

The Court: Do I understand that is changed when you get your press warmed up?

The Witness: Well, we generally do. Of course (790) this was a test run. With the little change Carroll made we were able to go ahead and run a couple of hours without getting back to the normal inks again.

Q. What change did he make? A. Well, he added some ingredients that he brought around.

Q. Was it a liquid or a solid? A. A liquid.

Q. Did he pour it out of a can? A. Yes.

Q. In each of the fountains? A. Yes.

Q. How many fountains were there? A. Eight.

Q. And after that did the press run all right with the inks? A. Yes, we ran a couple of hours.

Q. In the running of that two-hour run or test was there any difference between the operation of the ink in the fountain and your own heat-set inks? A. Not in the fountain, no.

Q. Was there any difference in the drying properties of the two-hour run test ink and your ink? A. They were dried with less heat, I would say.

Q. And this folder, Exhibit F-1, came out of the press in what condition? A. Very good, as you see it there.

Q. Perfectly dry? A. Yes.

Q. Would you look at the quality of the printing on Exhibit F-1 and let us have your opinion on it? A. Well, I would say it is a pretty fair job of printing. (791) However, it does not compare with the general run of our catalog.

Q. I show you the catalog, Defendant's Exhibit KK for identification, particularly page 59 of it, and ask you to compare it with— A. 59—well, these pages run different. This is a different house. That is a South Side page—it would be 57 here.

Q. Well, compare 57 of Exhibit F-1 with page 56 of Exhibit DD. A. Well, this is the type of ink—in other words, this test of ink had a flatter appearance.

Q. You are referring to the folder, Exhibit F-1 now, is that right? A. That is right—than the original run.

Q. That is, a modern ink makes a little better job, is that it? A. Oh yes, it naturally would.

Q. What causes the difference in gloss between these two exhibits in the ink? A. Well, that is a little trick maybe of the ink maker, knowing how to manipulate his

formula with the various types of varnishes and ingredients used.

Q. Did you ever put wax or grease in your inks? A. Yes.

Q. What is that for? A. Why, it gives you a little stability, and I would say it helps lubrication on the rollers; help trapping occasionally where you have to cut back for softening down; instead of using a solvent to cut (792) with, cut with a grease.

Q. Does the grease have any effect on the evaporation rate of the solvent? A. Well, I think it does. I think it slows it down a little bit so far as the rollers are concerned. However, that same solvent in the ink would flash out with the burner.

Q. That is, the burner is hot enough to flash out— A. Yes, it will take it out regardless of the grease in there.

Q. The solvent is heated at such a temperature that it all goes out? A. Those heaters will take most anything out of an ink.

Q. I show you this Montgomery-Ward Christmas Catalog, Defendant's Exhibit KK, and ask you if you recognize it (handing to witness)? A. Yes, I am very familiar with it.

Q. Who printed it? A. Well, that is printed in different houses. I think the Cuneo Press printed a lot of that. We printed the heat-set pages in there, and there is some offset work in there.

Q. The heat-set pages are what? A. This section here.

Q. Like Exhibit F-1? A: That is right—page 57. Of course they are different in that book—pages 58, 59, 60, 61—then it goes over to page 97. That insert (793) is in here, you see (indicating).

Q. Yes. A. And from 97 on.

Q. That is comparable to what pages in Defendant's Exhibit KK? A. This one here (indicating).

Q. Page 59? A. 57 in here.

Q. Well, look at that one, one of the pages in that catalog. A. Page 59.

Q. 59 to this one—is that 62? A. That is 62—compares here with 60.

Mr. Free: Of Exhibit F-1.

Q. Now how about the other pages in this bound book? A. 60 and 61 compare with 58 and 59 on this exhibit here.

Mr. Free: Exhibit F-1.

Q. You recognize this whole catalog? A: Yes.

Q. Where did it come from? A. Well, I do not know where it came from, but it came out of our plant apparently.

Q. Your plant? A. Yes, sir.

Q. You know it to be your product? A. That is right.

Mr. Free: I offer it in evidence as Defendant's Exhibit KK, the Montgomery-Ward Catalog formerly marked for identification with that letter.

(Defendant's Exhibit KK for identification received in evidence.)

Q. Now you mentioned that there are other types of printing in this catalog. Will you glance through it and (794) tell me what they are (handing to witness)? A. Well, this signature spread here is offset printing.

Q. What pages? A. 80 and 81—wait a minute. I will take 79, 80 and 81, get them all—and 82.

The Court: Page 79—

The Witness: 79 to 82 inclusive.

The Court: Is what?

The Witness: Offset printing.

The Court: What do you mean by offset printing?

The Witness: Offset printing is done through the transfer from a plate to a rubber blanket and

the impression is taken from the rubber blanket rather than direct from the plate. That is where the term "offset" comes from.

Q. That is a different type of printing from the heat-set ink process? A. That is right. Those are regular linseed oil type inks generally speaking.

The Court: You have to wait for them to dry?
The Witness: That is right.
The Court: It holds up the whole thing?
The Witness: That is right.

Q. That is why it is printed in sections? A. Well, you mean as far as that catalog is concerned?

Q. Yes. A. Oh, sure, it would have to be. This job is printed from sheets, flat sheets; I mean the offset pages.

(795) Q. What other kind of printing is there in that? A. A lot of McKee process.

Q. What does that mean? A. Well, this is four-color process done on the McKee press. These pages here are McKee pages.

Q. Pages what? A. Oh, there are any number of them—43 to 46 inclusive.

Q. What is the McKee process? A. McKee process is a press that prints the four colors wet in one operation, and there is no means of drying other than drying by oxidation.

Q. What other methods of printing is shown in that book? A. Well, there is a lot of rotogravure in here. These pages are all rotogravure (indicating).

Q. What numbers? A. Pages 47 to 58 inclusive here.

Q. Describe that process for us. A. Well, that is a process done in quite a different manner. The plates are all—or rather the cylinder is one large unit. For instance, there may be 32 pages on one unit.

The Court: On one roll?

The Witness: On one roll, yes. It is all done from an etching process, and the process is below the level. Instead of printing from a raised surface you are printing from——

The Court. Rotogravure?

(796) The Witness: Rotogravure, yes. Those inks are applied in a liquid manner: A copper cylinder passing through the liquid ink and being scraped off with what we call a doctor blade. That leaves the high spot of the plate free and clear of ink whereas the etchings will take on the ink and deposit it on to a sheet of paper direct from a pressure roller.

Q. And then where does the web go after the ink is applied? A. The web then passes over some hot drums. Each color in this case is heated. Every single color is heated and dried before it passes on to the next color. In other words, you are not printing four colors wet, or whatever the case may be. Each color is generally dried singly.

Q. And what does the heat do to the ink? A. It flashes the volatile off in the same manner of the four-color heat process, very similar. In fact the process in my estimation—the four-color heat-set inks are more or less a glorified rotogravure ink.

Q. And what is the difference between them? A. Well, your four-color heat-set inks are higher in pigment and higher boiling range solvents.

Q. Why does the solvent have to have a higher boiling range? A. In heat-set?

Q. Yes. A. Because the rolls are all exposed to the (797) air. In four-color rotogravure they are in an enclosed fountain generally.

Q. That is because the exposed ink would dry out. It has a low boiling solvent? A. That is right. It would set. It would not be able to print.

Q. Now those rotogravure presses in your subsidiary plant have hoods that carry off the vapors? A. Oh, yes.

Q. Just like the heat-set presses? A. That is right.

Q. How about the speed? Do they run about as fast? A. Oh, I think they run faster.

Q. How old is the rotogravure process to your knowledge as you have just described it? A. Well, it goes back quite a ways. I would say 20 years perhaps—maybe a little longer. I am not so sure.

Q. Now I notice something in this catalog, Defendant's Exhibit KK, the page numbering and print are different. Can you account for that? A. Well, different houses—the only reason I can account for it is this. For instance, Chicago would have a different page setup as against Kansas City or some other house.

Q. But the type is set up the same way and printed all the same way for all houses? A. Well, generally. Prices may change in various parts of the country.

Q. I show you now some samples of printing on Defendant's Exhibit I for identification, or rather some (798) ink samples on paper, and I ask you what would you say about the quality of that ink (handing to witness)? A. Well, you have some covered up here. You could not tell much about it. That is glassine.

Q. That is cellophane? A. Cellophane. Well, these are fair. I wouldn't say too much about the cellophane printing. This one is all right (indicating).

Q. That is, those that are marked 1 and 2 are pretty good? A. Well, I would say they are pretty fair, yes. It is a rather raw, rather a crude method here (indicating).

Q. It is all right for 1888 ink? A. I wouldn't brag too much about it.

Q. It is all right for 1888 ink? A. I think so, yes.

Mr. Free: I think that is all, your Honor.

The Court: I suppose your cross examination will take quite some time?

Mr. Byerly: I think it will be at some length, yes.

The Court: Well, we will adjourn until two o'clock.

(Recess to 2:00 p. m.)

---

(799) AFTERNOON SESSION.

RAYMOND A. KERLEY resumed the stand.

Cross examination by Mr. Byerly:

Q. Mr. Kerley, you saw this run of which Defendant's Exhibit F-1 was printed? A. Yes.

Q. How many copies were printed? A. Oh, I don't know. The job I think was four up, as we term it. There might have been eight or ten thousand copies.

Q. Do you know whether this one that was signed and put in evidence was taken near the beginning of the run or near the end? A. The end of the run.

Q. What was done with the other copies? A. We have them out there, I imagine.

Q. You did not use them in making up catalogs? A. No, we would not put them in the regular catalogs.

Q. They were not good enough? A. We would not. Is the regular catalog here? You have got it there, haven't you? (Hands catalog to counsel.)

Q. Has that the same page which is on the front of Exhibit F-1 in it? A. It is in there. However, it is a different folio. I think you will find it is 59. There you are.

Q. Now will you take Exhibit F-1. Will you see if you can rub the red off with your finger? A. This is (800) Exhibit F-1?

Q. Yes. A. (Witness makes test.) That is a pretty fair test.

Q. You did not press down very hard? A. No. We can probably do that on a good many different inks.

Q. Now can you do the same thing on the catalog? A. They are tighter.

Q. It does not smudge on the catalog the way it does on Exhibit F-1? A. That is right.

The Court: Which is Exhibit F-1 that smudged?

(Whereas it has been found that the document referred to as Exhibit F-1 in the cross examination of Raymond A. Kerley was a duplicate of Exhibit F-1 which had been furnished to plaintiff's counsel by defendant's counsel, it is hereby stipulated by and between counsel for plaintiff and defendant that said duplicate may be received in evidence as Plaintiff's Exhibit 67 with the same force and effect as though offered at the trial.)

Q. You know something about quality of printing, don't you? A. Yes.

Q. Have you ever seen a copy of a magazine called "Life"? A. Yes.

Q. What is it that you say about that as to quality? A. I would say that was a good quality commercial printed job.

Q. How does the quality of printing in "Life" compare with the quality of printing on the magazine called "True Romance"? A. "True Romance"; why, I would say it is a comparable job. It is a different sheet of paper.

Q. True Romance is one of the magazines printed by Hall's, isn't it? A. That is right.

Q. What sort of paper is it printed on? A. A super sheet.

(801) Q. What do you mean by that? A. What we call a supercalendar piece of paper, a high finish, and it is a hard sheet.

Q. You also print a magazine called "True Story"? A. That is right.

Q. What kind of paper is it printed on? A. That is the same thing.

Q. You print a magazine called "Parents"? A. That is right.

Q. What sort of paper is that printed on? A. Patent coated sheet.

Q. You print "Popular Photography"? A. That is right.

Q. Tell us some of the other magazines printed at Hall's? A. We have a hundred and one there. Well, Popular Photography, True Romance, True Story, Complete Photography, Parents——

Q. Those are the only ones you remember? A. There are a great number of smaller ones—Astrology. Those are the general run of heat-set magazines.

Q. There are some you do not use heat-set on? A. Yes.

Q. Which are those, for example? A. I should have brought some records along, I guess.

The Court: Who prints Life?

The Witness: R. R. Donnelley.

The Court: Where is it printed, in Chicago?

(802) The Witness: In Chicago. I think some in Philadelphia, the Eastern edition.

Q. Can you tell us any of the magazines you print without heat-set ink? A. There is an extension magazine runs without heat-set inks—Children's Activities. That is some of the magazines.

Q. But you say there are 101 altogether? A. I would rather have some records here so I would be more correct.

Q. What kind of paper are these magazines printed on that you do not use heat-set ink on? A. Some M. F. sheets, machine finished, and a coarser pulp stock on some of the papers.

Q. By "pulp stock" you mean a soft paper like newspaper? A. It is heavier than newspaper. It is a soft paper.

Q. It is heavier than newspaper, but just about as absorbent, isn't it? A. Pretty close to it. It is a harder sheet, however. Newsprint is about the softest thing we have.

Q. Hall prints a good many magazines on this pulp? A. Yes. We have what we call the pulp magazines.

Q. You print a lot of those? A. That is right.

Q. Those are the cheap magazines? A. Yes.

Q. Just when was it when you first came with Hall? A. 1937.

(803) Q. Do you remember in what time of the year? A. The first of the year.

Q. About the first of 1937? A. Yes.

Q. What had you been doing just before that? A. I had been with Hall on an experimental dryer about a year, I think all during 1936, something that I was getting out myself. It was a different process of drying than the type we have here now.

Q. That is something you were working on yourself? A. Yes.

Q. And Hall let you experiment there? A. That is right.

Q. That is something that did not ultimately develop? A. That is right. However, it developed in another stage through another company.

Q. Let us see, that was in 1936. What were you doing before that? A. Selling printing inks.

Q. For whom? A. Slight Metallic Inks Company.

Q. Where was that ink company located? A. Chicago.

Q. You were just a salesman for them? A. Salesman and service.

Q. And that was in 1935? A. Yes, that must have been in 1935 and back three or four years.

Q. That takes us back to about 1931 then? A. Right.

Q. What were you doing before that? A. I was in my own business, printing inks.

(804) Q. What was your business? A. Manufacture of printing inks.

Q. You were manufacturing printing inks on your own? A. That is right.

Q. About what period was that? A. About 1929 and 1930, I believe.

Q. How did that business come out? A. It did not.

Q. It failed, didn't it? A. It folded up.

Q. Were you making linseed oil inks then? A. That is right.

Q. What were you doing before you had your own business? A. Selling printing inks.

Q. Who for? A. A. R. Timberman Corporation.

Q. That was in Chicago? A. That was in Milwaukee, Milwaukee and Neenah and Menasha.

Q. You have said your experience in printing goes back to 1910; is that right? A. That is right.

Q. What kind of inks were they printing with when you started in in 1910? A. I believe they were linseed inks. I did not know much about the ink end of it those days.

Q. When did you begin to learn something about it? A. I think from then on.

Q. You started right in learning about it? A. That is right.

Q. You got pretty familiar with linseed oil inks? (805) A. Quite familiar.

Q. You knew how to mix them up and make them fit the work? A. That is right.

Q. You have spoken of a McKee four-color process? A. That is right.

Q. And in that case four colors were printed on each other while they were wet? A. That is right.

Q. What kind of inks were used in that process? A. We used a linseed and a gloss type printing inks, both types, or semi. It would be a combination of the two.

Q. How far back does this printing one color wet on top of another go? A. It goes quite a way. Speaking of two colors, two-color wet printing goes back 25 years.

Q. As long as that was done there was the problem of what you call trapping; making the two inks the right relative proportion and consistency? A. That is right.

Q. And that was worked out with linseed oil inks back in those days, I suppose? A. That is right.

Q. Did you sell any heat-set inks when you were in business for yourself? A. No.

Q. Did you know of anybody else who was selling them then? A. They were heat-set after a fashion, what we would call the flat bed quick setting ink. They would pass through an ordinary burner on a flat bed press.

Q. Those flat bed presses, they used to wait (806) somewhere for two hours up before they printed the other side? A. That is right; they would have to dry through oxidation.

Q. When you were in business for yourself did you come across any typographic inks that could be dried instantly by heat? A. Personally, no.

Q. When did you first see an ink that could be dried, saw it actually on a typographic press dried instantly by heat? A. About 1937.

Q. Where was that? A. W. F. Hall Printing Company.

Q. Was that an ink you made yourself? A. That is right. Wait a minute, just a minute now. 1937 we had inks in from the I. P. I. people at about the same time, I went into the manufacture of a similar type ink.

Q. That is, the I. P. I. inks were there at Hall's before you started to make that type of work? A. I would say that offhand. I have not got that record, but it is pretty closely tied together.

Q. The time you came there did Hall's already have heaters on their presses? A. No.

Q. Hall had had some of the I. P. I. quick-setting ink before they put in those heaters? A. Before the heaters?

Q. Yes. A. I don't think so.

Q. Would you know what inks Hall bought in 1936? (807) A. Meaning what?

Q. I am asking you a question. A. Before 1936?

Q. No, in 1936. A. I was not with Hall in 1936.

Q. Then you would not know what inks they bought? A. No.

Q. Do you know when they had these heaters installed? A. 1937.

Q. And when you joined them there in 1937 they had some I. P. I. quick-drying ink there, didn't they? A. Yes, I am pretty sure in 1937 we had some in there.

Q. Do you know how they came to install these heaters? A. No, I don't.

Q. If all they had was the kind of inks you were selling when you were in the ink business they would not have been likely to install these heaters, would they? A. I don't think they would.

Q. And they have been buying at least some of the I. P. I. heat-set inks most of the time you have been there; isn't that so? A. I think yes.

Q. First they bought the black and then they bought the colors? A. Yes.

Q. Is that right? A. That is right.

Q. And you were familiar with the I. P. I. inks before you set out to make yours, of course? A. Heat-set?

Q. Yes. A. Just from hearing about it; that is all (808) I can say.

Q. You saw some of it down in your plant? A. In our own plant in 1937.

Q. Yes, and you knew what it was made of? A. No.

Q. Well some of the Halls did? A. Knew what it was made of?

Q. Yes. A. I don't think so.

Q. You don't think so? A. If anybody would know I think I would know.

Q. Well when you set out to make your own inks, one thing you had to do—I mean when you set out there at Hall's to make a quick drying ink you had to have a solvent, didn't you? A. I wasn't sent in there to make quick drying inks. I am ahead of that.

Q. When you started there, after they got the I. P. I. quick drying inks and after you started to make some quick drying inks, didn't you? A. Yes, but ahead of that I was working on a drying arrangement myself, so I was quite familiar with what was going on in that respect in the drying of inks.

Q. What kind of inks were you trying to dry in your own arrangement? A. An ordinary ink.

Q. Ordinary linseed oil? A. Linseed type.

Q. What were you using, ozone or something? A. No.

Q. You had another way of drying linseed oil inks? (809) A. Yes.

Q. Were those inks which you made after the I. P. I. ink had come in there different from those that you were trying to dry on your own arrangement? A. The inks that I had made at the time? Yes.

Q. And when you set out to make these quick drying inks after the I. P. I. ink, that is after the I. P. I. ink arrived there, did you make them with linseed oil? A. No; a certain proportion, a small proportion.

Q. But you had to have some kind of a solvent, didn't you? A. That is right.

Q. Whom did you get that solvent from? A. I never got a solvent from anyone, not for the purpose of a heat-set vehicle. I bought the varnishes with the solvent in it.

Q. Oh, you bought them all made up with the varnishes and the solvent mixed together? A. That is right.

Q. Whom did you buy that from? A. Is it necessary that I answer that question?

The Court: I think so. There is no objection made by anybody.

Mr. Free: Is it something, Mr. Kerley, that has something to do with your private ink-making affairs?

The Witness: Well in a sense it has, yes.

Mr. Free: I think it is immaterial where he got them, your Honor.

(810) Mr. Byerly: It seems to me, your Honor, this man is taking a little credit for making this when he bought the varnish, which is the main part of the ink, ready made. We ought to know where it came from.

The Court: In order what came from?

Mr. Byerly: Where the varnishes came from.

The Court: What would it prove in this case?

Mr. Byerly: I think it would prove for one thing that this witness had nothing to do with originating these inks, that he simply bought them all except the pigment, and mixed the pigment in.

The Court: You haven't asked him that yet. I will sustain the objection.

Q. As I understand it, when you set out to make these quick drying inks at Hall's, after they had the I. P. I. quick drying ink, you bought the ink varnish from someone else? A. Right.

Q. And that ink varnish I suppose consisted of a solvent, with something dissolved in it, didn't it? A. That is right.

Q. And then what you did was to mix that with pigments and adjust the consistency and one thing or another and make the inks; is that right? A. Formulate it.

Q. I understand you do not want to tell us where you got that varnish that you made these heat-set inks from?

(811) A. I do not think it is necessary.

Q. You mean it would do you harm in your business—

The Court: Well don't pursue that. The Court has sustained the objection. Let us go on to something else.

Q. Were the I. P. I. colored inks in there as well as the black inks when you came to Hall's? A. No.

Q. You are sure of that, are you? A. Positive.

Q. Was the I. P. I. black ink tried out on— A. Wait a minute, I will take that back. In a sense—you are speaking of four-colored presses?

Q. I was speaking of heat-dried inks. I did not say how many colors there were. A. Well, I am still not positive.

Q. That is, there may have been I. P. I. colored inks in there? A. There is a possibility, but I wouldn't want to swear to it right here on the stand.

Q. When you made these inks did you use the same varnish in all the inks you made? A. No.

Q. You got different varnishes? A. Different viscosities.

Q. Did you find out what the varnishes contained? A. I know.

Q. What was it? A. Well, I think I just have—his Honor here said it wasn't necessary for me to answer it.

(812) The Court: That was where you got them.

Mr. Free: Again, Mr. Kerley, is that something you would rather not say? Is that a trade secret, or something?

The Witness: Well, I would rather not, yes.

Mr. Free: I think that is a question that ought not to be pursued, your Honor. It is immaterial anyway.

Mr. Byerly: It seems to me——

The Witness: I think it is a trade secret. I don't know why I have to tell it all here.

The Court: You mean what this ink is made of?

Mr. Free: Yes. These inkmakers are compounders, and they are very proud of their own little skill and their own little tricks. I think this is an effort to find out how he makes his inks. Maybe he makes better inks than I. P. I. does. It is one of those things that doesn't make any difference, and I do not think he ought to be pressed to answer a question like that.

Mr. Byerly: If your Honor please——

The Court: Well, if it is a trade secret—Is there a patent on it?

Mr. Free: No.

The Witness: No.

Mr. Free: Just the little tricks that they have in compounding, like a druggist does.

(813) Mr. Byerly: I am merely asking him what the vehicle is made up with.

The Court: You mean the solvent?

Mr. Byerly: The solvent, and the resins, whatever there were.

The Court: I do not see that it has anything to do with the case.

Mr. Byerly: That is what our patent is on, and it seems to me if this man has made any ink that is relevant to the case we ought to know what it is made of.

Mr. Free: Well, he is not a party here. He likes to keep these things to himself. It certainly is immaterial.

The Court: He is not a party to the case. He does not have to answer it. He told us it is a trade secret which will injure his business if he did answer it—is that correct?

The Witness: In a sense I would say that, your Honor, yes. I have a few little tricks, like any other ink maker, and I do not——

The Court: They are personal to you?

The Witness: They are personal to me, yes.

The Court: Things that you discovered?

The Witness: Well, I had quite a bit to do with it, yes.

(814) Mr. Byerly: I asked him, your Honor, the composition of the ink varnishes that he bought. That can hardly be his personal secret. The way he mixed them together after he got them may have some little trick about it.

The Court: I have already ruled on that.

Mr. Free: It is already passed.

The Court: All right, go ahead. I will sustain the objection.

Q. What gave you the idea of buying heat-set varnishes in 1937? A. Because we did not have the facilities to make our own.

Q. You never had at Hall's any of these quick-setting quick-drying inks, before you saw the I. P. I. ink, had you? A. No, that is right.

Q. Now, when you were in business yourself were you making intaglio inks, rotogravure inks? A. No.

Q. Have you ever sold rotogravure inks? A. Yes.

Q. But before 1937 did you ever try to make a typographic ink that would set by evaporating solvents? A. No.

Q. You knew that is the way rotogravure inks set? A. That is right.

Mr. Byerly: That is all.

Re-direct examination by Mr. Free:

Q. Mr. Kerley, you were asked whether or not it is (815) true that the red smudges on Defendant's Exhibit F-1, this little circular. You said it did a little. A. That is right.

Q. I managed to smudge the red on Exhibit KK. A. You can get it all off.

Q. They all do that? A. If you want to put enough pressure on there they all can get it. Some people have a sandpaper thumb or finger.

Q. But in ordinary use it does not come off? A. It came through our folder O.K., and dried sufficiently. That is the main thing we were interested in, and to be sufficiently dry that they would not smear after, after being collected on collecting machines for binding.

Q. Now as to these heaters which dry the ink. You said they are pretty hot? A. They are.

Q. Does the paper sometimes scorch? A. It does.

Q. I want to ask you about how much typographic ink you use in a year at this one plant of Hall's. Can you give me an approximate idea? A. Oh, 300,000 pounds—offhand. I don't know—something like that. It is a lot of ink.

Q. That is typographic ink? A. That is all typographic ink. That is aside from our subsidiary plant, to the best of my knowledge offhand here.

Q. How much does that subsidiary plant use; have you (816) any idea? A. Well, I imagine they use more. It is a different process. I don't know what their figures are. I wouldn't want to say.

Q. How many pounds a year did you say, 300,000? A. Three million—correction.

Q. Just one cipher wrong? A. Yes, that's all.

Q. How did these I. P. I. inks work in 1937 that you are asked about, that is the heat-settings? A. Well, they could have been improved, and they naturally had to improve them. I mean as time progressed. We had trouble. I mean we couldn't shut a press down for any length of time without having to spray immediately and they were very fast in the solvent, apparently.

Q. How did that manifest itself, that drying out of the solvent? A. Well, that would cause a gummy condition, so if you were printing in four colors instead of one you wouldn't do a good job of trapping one color upon the other.

Q. The ink would gum up on the rolls? A. However, in those days they weren't printing but one or two colors at the most. Ken Magazine was a two-color job they had at the time.

Q. You couldn't use these heat-set inks without a heater of some kind? A. No.

Raymond A. Kerley, for Defendant—Re-cross.

Q. It would stay wet all the time? A. Well, they would dry eventually, but you wouldn't be able to run them through (817) a press; that is through a folder.

Q. I think you said you worked for Metallic Ink Company; is that right? A. Yes sir.

Q. Metallic pigments are among the class— A. Well, the name is a little confusing there. It really did not have much bearing. They made a general run of commercial inks.

Q. Metallic pigments are in the class of ordinary pigments, aren't they? A. No. That is a metal.

Q. Yes, but it is a pigment? A. It is a pigment, so-called.

Q. Now in these flat-bed presses, where you said, I think, partial drying resulted— A. A setting.

Q. What do you mean by "a setting"? A. In other words, you print a sheet and it is wet to look at, and if it passes through a flame it will dull out, it will flatten down. You lose a little bit of the sheen, and it settles into the sheet a bit. It isn't dry.

Q. Is it still wet? A. It is still wet.

Mr. Free: That is all.

Re-cross examination by Mr. Byerly:

Q. May I ask you one question about these heaters that were installed there at Hall's. Do you know how much those heaters cost, what investment they made there in heaters in 1937? A. Yes—about $100,000 I would (818) say offhand.

Q. Do you know when they ordered those? A. Well, they were ordered in 1937, just what time—I could give you the installation dates of it.

Q. Are you sure they weren't ordered in 1936? A. They could have been, but I doubt it now. I say I doubt it. I don't know.

Q. Would it surprise you— A. I wasn't there.

Q. No, but would it surprise you to find the I. P. I. heat-set ink was the only one the company tested before they ordered those heaters? A. Would it surprise me? It probably would—I don't know.

Q. You don't know. A. As I say, I don't know.

Mr. Byerly: All right, that is all.

Mr. Free: That is all, Mr. Kerley.

Mr. Free: Now if your Honor will remember we held Mr. Taylor for further cross-examination, and I offer him now for that purpose on the question of these McElroy inks.

Mr. Byerly: All right, put him on.

CLINTON TAYLOR recalled.

Cross examination resumed by Mr. Byerly:

Q. Can you produce the memorandum you sent to Mr. Carroll in connection with the Doughty patent? A. No, I (819) cannot. To my recollection there was no memorandum that was taken to Mr. Carroll. The only memorandum was a telephone call that I would like to work in his plant with these inks on a large scale.

Q. But you did not give him any information about the Doughty patent? A. Not about the Doughty patent, no.

Mr. Byerly: That is all.

The Court: Whom did you give the information to?

The Witness: Mr. Carroll.

Mr. Free: That is all.

Mr. Free: Your Honor, I am embarrased. I thought it would take longer than this. I am not ready to go on with another witness until tomorrow morning.

The Court: Get all your witnesses together and have them all here tomorrow.

(Discussion off the record.)

The Court: Is there something else you can do this afternoon?

Mr. Free: I might suggest this: if the plaintiff wanted to go ahead with his rebuttal we could put on my witnesses tomorrow, interrupt that and put them on tomorrow and save that much time.

Mr. Byerly: If your Honor please, I do not like to put in rebuttal before the defense is concluded, but (820) there is this to be said——

The Court: You started to do it.

Mr. Byerly: Yes, I had to in one case, but I will be glad to do it again if it helps us, because we have a number of depositions on the commercial success and actual use of this ink. Of course Mr. Free is already familiar with this, and I would be glad to have some of those read this afternoon to fill in the time, if your Honor would consider that advisable.

The Court: Would that take the rest of the afternoon?

Mr. Byerly: Well those would have to be read before the end of the trial.

The Court: Whose depositions are they, Mr. Free's?

Mr. Byerly: No. They are the plaintiff's, which we took for rebuttal, and in case the validity of the patent has been attacked——.

The Court: If you care to do it go ahead, but I won't force you to.

Mr. Byerly: I should be glad to do it.

The Court: Any witnesses that are to be called must be here tomorrow at 10:30. I give notice to both sides. There won't be any further delay. They ought to be under subpoena before you give an excuse for their absence; but we will proceed, however.

(821) Mr. Byerly: If your Honor please, my associate tells me that if we have a 10-minute recess he will have the depositions and the exhibits all ready, and then we can go ahead and put those right in.

The Court: We will take a ten minute recess.

(Short recess.)

Mr. Byerly: We have asked the reporter to place these depositions in plaintiff's rebuttal, after the end of the defendant's case in the minutes, if that meets with your Honor's approval, rather than having them interjected at this point in the minutes.

The Court: Very well.

(The depositions referred to were read.)

The Court: Now what do we have tomorrow?

Mr. Watson: Tomorrow Mr. Free will have some testimony.

Mr. Free: Yes. I am going on with the testimony of one out of town witness from Massachusetts, and perhaps one more.

The Court: You will be through tomorrow?

Mr. Free: Yes.

The Court: And then what do you have?

Mr. Watson: We will have three witnesses, at least, I should say, rebuttal witnesses, depending on how many Mr. Free is going to put on.

(822) You are going to put one on tomorrow morning and one tomorrow afternoon?

Mr. Free: One or two. Either one will not take more than an hour, so I think tomorrow morning will finish me up.

Mr. Watson: You have two?

Mr. Free: Not more than two—let me put it this way, perhaps only one.

The Court: And I suppose you gentlemen want to furnish trial briefs?

Mr. Watson: Well I think we would abide by your wishes with regard to that.

Mr. Free: I would like to leave it up to you, your Honor. I would like to spend some time on a brief, but if your Honor wishes us to argue it——

The Court: I suppose I will have to take this case home and think about it.

Mr. Free: Or you can decide it from the bench.

The Court: If I thought I could I would let you argue it, but it is too big a case, too much involved. I think I will have to have you file briefs and dispense with the argument.

Mr. Free: Or we can do both. If it would be helpful to you to have an argument I would be glad to have an argument and a trial brief.

(823) The Court: We will see. Then you will have three witnesses after that?

Mr. Watson: I should say at least three.

The Court: Do you think you might finish tomorrow?

Mr. Watson: We might very well.

The Court: That is the testimony.

Mr. Watson: I do not think that my witnesses will take tomorrow afternoon.

The Court: Very well. We will adjourn until 10:30 tomorrow morning.

(Adjourned to Tuesday, January 26, 1943, at 10:30 a. m.)

(824) New York, January 26, 1943;
10:30 o'clock a. m.

TRIAL RESUMED.

Mr. Free: Last evening my out-of-town witnesses came in, and after talking to them I decided that their testimony would be largely cumulative and I would not bring them in this morning, and so I shall offer a few items and then close. Meantime I have called Mr. Byerly and told him what the circumstances were.

First I should like to offer as Defendant's Exhibit N-2 four patents which were submitted by the plaintiff in plaintiff's Particular No. 4.

The Court: What do you mean by "Particular"?

Mr. Free: Well, his bill of particulars. I asked him this question, "Submit information, including descriptive matter and drawings or photographs, necessary to complete understanding of apparatus and or process for effecting the steps stated in lines 19 to 22, inclusive, column 2, page 2 of the patent in suit, as follows: 'At the conclusion of the printing operation, the printed materials may be subjected, in known manner, to sufficient heat to dry the thin film of the (825) print very rapidly.'"

The Court: Where is that?

Mr. Free: At lines 19 to 22 of page 2, column 2.

His answer was: "Plaintiff submits copies of the following patents", and these are the patents that I am offering.

(Marked Defendant's Exhibit N-2.)

Mr. Free: Your Honor perhaps will recall that a plaintiff's *prima facie* case I asked him some questions about the diethylene glycol and offered a set of curves, which were marked for identification as Defendant's Exhibit A. This curve is a reproduction of Fig. 2 of an article in Industrial and Engineering Chemistry for July 1926,

which was referred to in the file wrapper of the patent in suit. First I would like to offer the complete article as Defendant's Exhibit O-2.

(Marked Defendant's Exhibit O-2.)

Mr. Free: And then I would like to——

The Court: What are they, vapor pressure curves?

Mr. Free: Vapor pressure curves, yes. I offer the enlargement of Fig. 2 of this article as Defendant's Exhibit A.

(Defendant's Exhibit A for identification (826) received in evidence.)

Mr. Free: Next I should like to offer the Lefferts and Stevens prints submitted by Mr. Taylor and marked now for identification. You will recall that on objection this was ruled out because Mr. Taylor was not a printer, he was not qualified to give the information. I now offer it as exemplifying Mr. Taylor's own work with the Lefferts and Stevens patent inks.

The Court: You mean his own work with that patent?

Mr. Free: He made prints, these prints are Exhibit I for identification.

The Court: According to that patent?

Mr. Free: Yes, so I am not offering them as a work of an expert printer but rather as exemplifying the inks of that patent, and I offer them as Exhibit I.

Mr. Byerly: I object to this on the ground that the witness's testimony showed that they were not made in accordance with the patent under which they purport to be offered, that is, the Leffer's and Stevens patent. You may remember that the witness testified that half-second cotton did not appear until after.

Mr. Free: There is no half-second cotton on that, but there is resin.

(827) Mr. Byerly: That is another one of the inks he made?

Mr. Free: All of these ingredients are named in the Lefferts patent and the witness testified they were, and he pointed to the patent that they were there. The only question as to the exhibit was his expertness to describe the quality of the printing, so I am offering it merely as exemplifying his work with the Lefferts and Stevens inks.

The Court: It may be admitted.

(Defendant's Exhibit I for identification received in evidence.)

Mr. Free: If your Honor will recall, yesterday I offered the file of the abandoned application mentioned in the patent in suit and pointed out that it was for a process, and that application having been abandoned by the plaintiff the process belongs to the public generally, and this patent here in suit is confined to the ink. Notwithstanding that, the correspondence between the plaintiff and defendant's attorneys indicates that the plaintiff is attempting to broaden the patent here to include process as well, and I should like to offer in evidence a letter dated July 22, 1941, from Interchemical Corporation to Messrs. Nims and Verdi, who were at that time attorneys for the defendant. (828) That was before I got in, and it mentions the patent in suit and is in response to the warning notice of the plaintiff to the defendant, and it inquires particulars. It said, "What claims are you talking about?" etc. So the paragraph of the letter which I would like in evidence reads:

> "While our letter to your client relates to any inks which your client is manufacturing or selling which infringe our U. S. Letters Patent No. 2,087,190. We refer more particularly to inks which are designed to be set by the application of heat and which are sold to publication printers for use on rotary presses equipped with heating units."

I offer that letter as Defendant's Exhibit P-2.

Mr. Byerly: I object to that as immaterial.

Mr. Free: It is correspondence between the parties, and I think it is distinctly material. It mentions the patent in suit, and in fact this suit——

The Court: You claim this broadens the patent here?

Mr. Free: Yes, they are trying to cover all the inks that are designed to be set with the application of heat, and I simply want that in the record to show what the effort of the plaintiff is, notwithstanding its very (829) narrow patent here.

The Court: What is the legal effect of that? What are you going to argue from it? What is its probative value?

Mr. Free: It bears directly on the issue that I mentioned in the opening statement, that the patentee here is trying to broaden his patent to include more than his invention.

The Court: By this he means he is claiming all solvents that are evaporated by the application of heat?

Mr. Free: That is right.

The Court: I will receive it, but I do not see much use in it.

(Marked Defendant's Exhibit P-2.)

Mr. Free: Also to emphasize the distinction between the method which is in this abandoned application, Exhibit M-2, and the patent in suit, I would like to read into the record the claim which the plaintiff abandoned to the public on the method.

Mr. Byerly: Isn't that part of the file wrapper? Have you put that in? Are you reading from one of your exhibits?

Mr. Free: Yes, I am reading the method from the file wrapper of the method of application.

(830) Mr. Byerly: Did you put that in?

Mr. Free: Yes.

Mr. Byerly: I think the exhibit speaks for itself. There is no point reading parts of it into the record. If he wants

to put that file in, your Honor will presumably have to examine the whole file to see what it is all about.

Mr. Free: I would like to dig out this one claim.

The Court: The Court would like to know what parts you rely on so that it won't have to read through a lot of useless material. Go ahead.

Mr. Free: I will refer to page 29 of Defendant's Exhibit M-2:

> "The method which comprises printing upon a continuously traveling web with an ink comprising a coloring material and a vehicle therefor containing a thickening agent and solvent with a sufficiently low vapor pressure to make the ink suitable for all press-room printing conditions, and thereafter increasing the vapor pressure by the application of heat to the web and thereby substantially evaporating the solvent to make the ink sufficiently dry to permit the second side printing without smudging."

(831) Now that is the method which the plaintiff here has abandoned, and he did so formally on December 29, 1940, as shown on page 40 of Defendant's Exhibit M-2 where Mr. Gessler signed this formal abandonment for himself and Interchemical Corporation by someone whose name I cannot read but the secretary affirmed it, where Interchemical Corporation also abandoned this application. I mention this because it must be clear that the patent in suit is confined solely to an ink and that the method belongs to the public, including the defendant.

Mr. Byerly: May I see that for a minute, please?

(Mr. Free hands to Mr. Byerly.)

Mr. Free: I would now like to ask Mr. Byerly to produce the letter which I asked for yesterday in the notice to produce, of which he kindly gave me a copy last night. This is a letter dated February 8, 1928, by Carbide & Car-

bon Chemicals Corporation to Cray-Finne Company—your Honor will remember that was the company which was bought out by the plaintiff here, and Mr. Cray and his company worked with Gessler to formulate this ink.

This letter, the original of this letter was obtained from plaintiff's own files in accordance with notice to produce. It is addressed to the Cray-Finne (832) Company—presumably it has been in the plaintiff's files ever since and the Cray-Finne's files prior to that, and I offer it in evidence as Defendant's Exhibit Q-2. This letter——

Mr. Byerly: If your Honor please, I object to the offer.

The Court: Let him finish his offer.

Mr. Byerly: Oh, I am sorry.

Mr. Free: This letter is addressed to Cray-Finne Company by Carbide & Carbon Chemicals Corporation.

The Court: A third party?

Mr. Free: Yes, the manufacturer, if you will remember, of the butyl carbitol. It suggests to the Cray-Finne Company not only ethylene and diethylene glycol but also carbitol and butyl carbitol. I want this letter in evidence because——

The Court: You say it suggests what?

Mr. Free: That carbitol and butyl carbitol as early as February 8——

The Court: Suggesting it as what, a drier?

Mr. Free: No, the Cray-Finne Company is an ink company——

The Court: Suggest that they use it?

Mr. Free: Well, I will read it:

> "Gentlemen: We recently forwarded you samples (833) of Ethylene Glycol and Diethylene Glycol for experimental purposes. As we have not yet received any word regarding the results which you obtained with these materials, we are taking the liberty of writing for this information.

"We are pleased to announce two new solvents, Carbitol and Butyl Carbitol, which are the monoethyl ether of Diethylene Glycol and the monobutyl ether of Diethylene Glycol, respectively."

Then it goes on and mentions prices, which I won't read. In the second last paragraph it states:

"If you are meeting with difficulties in the application of either of the above compounds to your specific problem, we could no doubt be of assistance to you in view of the extensive experience we have had with these compounds."

The Court: Why is that binding on the plaintiff, written by a third party?

Mr. Free: I would like to have this in because this is a recommendation by the producer of butyl carbitol to Cray-Finne Company, which is part of the plaintiff company now, prior to the time that Gessler did any experimenting, according to his own statements so far, recommending butyl carbitol——

(834) The Court: You mean he got the idea from that letter?

Mr. Free: That is what I shall contend, yes.

The Court: I do not think it is binding in the slightest on him—written by a third party. It is a gratuitous writing.

Mr. Free: Well, it shows a direct instruction from the manufacturer of the stuff, butyl carbitol, to Cray-Finne for using butyl carbitol.

The Court: They are just trying to sell a product to them. I will sustain the objection.

Mr. Free: Then may I add something. I would like also to put this letter in to show that butyl carbitol was a new product by the Carbide & Carbon Chemicals Corporation on February 8, 1928.

The Court: Well, it is a hearsay statement. I will rule it out.

Mr. Free: Also I should like to offer in evidence as the state of the art another Doughty patent, No. 1,439,695, as Defendant's Exhibit Q-2.

Mr. Byerly: Your Honor, I object to this. The defendant has put in a bill of particulars stating the patents on which they were going to rely, both the state of the art and the anticipation of this patent and this was not mentioned in either instance. I do (835) not see any reason why it should be brought in at this time after their expert has testified.

Mr. Free: I am putting it in merely as a state of the art which I can always show, and also it is a file wrapper patent, which is another way of getting it in, cited during the prosecution of the patent in suit.

The Court: I will admit it.

(Marked Defendant's Exhibit Q-2.)

Mr. Free: Defendant rests, your Honor.

REBUTTAL PROOFS

(836) Deposition read in evidence of Edward B. Busby produced as a witness for plaintiff, who, being first duly sworn, deposed and said:

Direct examination by Mr. Watson:

Q1. State you name, please. A. Edward B. Busby.

Q2. Where do you live, Mr. Busby? A. 4828 Kimbark Avenue, Chicago, Illinois.

Q3. What is your occupation? A. I am General Superintendent for R. R. Donnelley & Sons Company.

Q4. How long have you occupied that position? A. Since 1934.

Q5. The business of R. R. Donnelley & Sons Company, as I understand it, is printing. A. Printing, binding, engraving, lithographing, rotogravure work.

Q6. You have been subpoenaed to testify in this case today? A. Yes, I was subpoenaed.

Q7. What types of press are used by you in the printing performed here? A. You want me to tell all the types of presses that we use?

Q8. By that I mean, you do typographic, or letter-press printing? A. We do letter-press printing; we do rotogravure printing; we do lithographic or offset printing. We have three basic types.

Q9. As I understand it, letter-press printing is that in which you use raised characters which transfer ink to the matter to be printed upon, such as paper? A. That is correct; that is right.

Q10. Whereas, in rotogravure printing, your (837) characters are engraved below the surface of your printing cylinder? A. Perhaps I can say it in my own words.

Q11. If you will. A. Letter-press printing is printing that has raised characters, either type or plates.

Lithographic printing is printing from a surface that is practically flat and is printing by a principle that oil and water do not mix.

Rotogravure printing is intaglio, so that you are actually printing from a reverse surface, the ink being pulled out of the wells in the cylinders.

I think that is about the simplest.

Q12. You use very different types of ink with each type of printing; that is, each type requires its own type of ink, is that right? A. Yes.

Q13. That is, you could not use the same ink for rotogravure or typographic printing, or letter-press printing, and vice versa, isn't that correct? A. That is correct. But on letter-press printing we use two entirely different kinds of inks.

Q14. What kinds do you use? A. We do some of our printing by the old standard process, where we use oil inks. We also use heat-set inks for a great deal of our printing.

Q15. Are those oil inks that are also referred to (838) as the oxidizing type inks, linseed oil inks, for instance, is that what you mean? A. When I refer to oil inks, I refer to the inks that dry by either oxidation or absorption.

Q16. I see. A. I am not an ink maker; I am a printing press superintendent.

By Mr. Free:

Q17. Do you feel qualified to answer those sorts of questions? A. Yes, I do.

Q18. You know that they dry by oxidation in the class that you mention? A. Oil inks?

Q19. You know that they dry by oxidation? A. Yes.

By Mr. Watson:

Q20. How long have you been using other inks than oil inks; or do you call them heat-set inks? A. Heat-set inks.

Q21. How long have you been using these, Mr. Busby? A. I wonder if, in order to answer that question, it would be all right for me to read a memorandum that I have prepared, which gives the history of what we have done with heat-set inks; is that satisfactory?

By Mr. Free: Will you tell me where you got the information? Is it from the records of the company? I would rather not have you read it. I would rather have you refer to it to refresh your recollection, if those dates can be authenticated from the records of the company.

The Witness: The reason I wanted to read it was (839) that I wrote it down because I wanted to

be sure that the information that I have put in here is accurate.

Mr. Free: I would rather have you state the story from your recollection, in your own words without reading the paper.

By Mr. Watson:

Q22. The paper that you have referred to was prepared by you personally, referring to your own personal experience and records of the company? A. Yes. No information was furnished me by anyone else. No one else had anything to do with the writing of the paper, and no one had any part in the information I have here. Almost all of this is my own personal recollection. I verified a few dates.

Q23. I see. I think my last question was, when did you first begin to use heat-set inks. Suppose I withdraw that question and ask you to tell us the history of the use of heat-set inks by your company. A. All right. The first time that I heard anything about heat-set inks was sometime early in 1935 when Mr. Whinnery, who was head of our Purchasing Department, and who called me into his office and introduced me to a Mr. Moscovics, who was connected with the Levey Company, and we talked about the possibility of using this new heat-set ink. I think they referred to it as "Flash-Dri" ink at that time.

(840) I did not do anything about it at that time, and in November, 1935, Mr. Whinnery again called me in and introduced me to Mr. Roderick Smith of the International Printing Ink Company.

Mr. Smith told me that I. P. I. had been experimenting with an ink which was similar to Levey's "Flash-Dri" ink, and that they were in a position to put that into production in a printing plant.

We were very anxious to cooperate with any experiments that could be conducted, because we realized that

an ink of this kind, if it could be made to work, would revolutionize letter-press printing.

Mr. Free: When you say "we", you mean, yourself, don't you; that is your opinion you are giving?

The Witness: Yes, I do.

By Mr. Watson:

A23. (Continuing). At that time I discussed it with our press-room superintendent, and then other technical men in the factory. Mr. Young, who was superintendent of our press-room, was probably one of the best press engineers in the country; he is also our chief engineer; and when I talked to him about it, he and I realized immediately we had——

Mr. Free: What I wanted to point out is, what you know yourself, in your opinion, is all that will be used by the Court here, and not what someone told you.

(841) The Witness: Yes. I should not say "we". I should say "I" throughout.

Mr. Free: Yes.

By Mr. Watson:

Q24. That was the editorial "we" you were using, was it, Mr. Busby? A. Yes.

Now, the reason for that was that up till then, this time, we had been forced to confine our printing on rotary presses to absorbent stocks, and we had not been able to print on rotary presses and perfect the printing on coated paper without considerable offsetting.

We had used other anti-offset methods, like the starch sprays; but they had not produced the results that we needed.

Now, if this new ink would make it possible for us to print on coated papers, or enamel papers and perfect the sheet and then immediately fold and deliver folded sig-

natures from the press, it would enable us to print a great deal faster than we ever had been able to print on flat bed presses on this kind of papers.

The next step up with the International Printing Company line was some drying equipment that they developed, and we installed this on Press 2, and the experiments that we conducted on this press showed a lot of promise.

(842) I also remember that about that same time we tried out some Levey inks in addition to the I. P. I. inks; but our experience with Levey inks was not quite as good as the I. P. I. inks then.

About that time Time, Incorporated, conceived the idea of a new pictorial magazine which they wanted to print on coated papers.

They wanted to produce a high grade job, and they wanted to produce it at speeds that would be impossible by the old-fashioned flat-bed methods.

Based on our experience on Press 2, and the promise that they showed, we entered into a contract with Time Magazine to print the new pictorial magazine, which was later called "Life".

Our original arrangement was to print 400,000 copies a week, and from the production picture that they first gave us we expected to produce about 250,000 copies and then gradually work up to four hundred or five hundred thousand copies.

The first issue, which was November 23, 1936, called for a printing order of about 350,000 copies. It grew by leaps and bounds. By January we were printing 700,000 copies, and by July over a million.

In the years since then, it has continued to grow so that at the present time we are printing (843) approximately three and one-half million copies——

Q25. Is that per week, Mr. Busby? A. Per week; and Cuneo's are printing six or seven hundred thousand copies in their eastern plant at Philadelphia.

Mr. Free: Is Cuneo a part of the Donnelley Company?

The Witness: No, sir.

Mr. Free: Then all you know about Cuneo is what you heard.

The Witness: No, that is not all I know about Cuneo, because we print all of the color work and ship it to the eastern plant.

Mr. Free: I see.

By Mr. Watson:

A25. (Continuing) And we also print some of the 2-color heat-set printing and ship it to the eastern plant; so I am sure there have been at least 700,000 copies, because we are shipping it out to that plant at this time, so it is not hearsay. Cuneo's only print the body, and they do not print all of the color work, and they do not print any of the covers and inserts. Their quantities run higher than the figure I give. I have been conservative in that figure.

Now, our first printing of heat-set ink was done by the converting of presses we had, putting special heating equipment on, which we designed on other (844) presses, which would print Life size. I say that that is the first printing after the printing we did on Press 2.

Now, as soon as we signed a contract with Life, we placed an order for four 64-page, single color presses which we bought from the Hoe Company, and they were specially designed for heat-set printing, and were able to run at faster speeds than the equipment we had up to that time.

Later we bought—later, over a period of time, we have bought four more 64-page heat-set presses, 2-color presses, for printing Life 2-color work.

Time Magazine is also being printed by this same process. We bought some special presses from the Hoe Company.

Can I change that? We bought two special presses from the Hoe Company for printing Time, and we converted two other presses to use this same heat-set press.

We print eight or nine hundred thousand a week of the Time Magazine, and we ship enough color-work to Cuneo's eastern plant so that they can bind approximately half a million a week.

We also equipped a number of our 2-color rotary presses so that we could print Sears, Roebuck (845) and Montgomery Ward 4-color rotary printing by this same heat-set process. We print the 4-color by using a 2-color press and printing half the normal capacity of the press.

We have also bought a number of 5-color perfecting presses from the Cottrell Company, which uses this same heat-set process.

These presses will print four or five colors on each side of the sheet and deliver perfected sheets. One of them has a folder on it which delivers folded signatures.

We also use this process in the printing of Farm Journal Magazine, a monthly, which runs about two and one-half million copies per month.

I believe that I am safe in saying that the development of this process has enabled us to just about double our volume of business. I believe the statistics that show the amount of paper that goes in and out of this plant, in 1941 or 1942, as compared to 1935, would show this.

I think that is about the story of what has happened here at the plant.

Q26. There are some terms you have used, Mr. Busby, that would seem quite technical to a person not familiar with what I find to be a very technical industry. I think (846) we ought to have a definition of those terms in the record. Are you printing Life at this moment? A. Yes, sir.

Q27. Now, you mentioned "signatures" and "folded signatures", and so forth. I wonder if we could see a

signature of Life as it is now being produced, which is unfolded, and one which is folded, for the purpose of illustration, and see what we are talking about on that? A. Yes. I can give you folded signatures, and I can give you flat sheets.

Q28. I wonder if we could have one. A. I can give you a sheet of Life Magazine, the color work printed with oil inks, where we print only one side and let it dry, and back it up on another press.

Q29. All right. A. And I can give you similar signatures which may be printed on a rotary press with heat-set inks, where we perfect the sheet and fold it in one operation on the press.

Q30. I think it would be very helpful if we could have that. A. I will get them right now.

Q31. I would like the record to show that Mr. Busby was good enough to conduct us through a portion at least of the plant of the Donnelley Company, where we saw printing actually being done; by "we", I mean counsel for plaintiff and counsel for defendant.

(847) In the course of that trip we picked up several things that I believe you have referred to previously as signatures; is that right, Mr. Busby? A. The ones that are folded are called "signatures".

Q32. I see. And what are those that are not folded? A. Well, we refer to them as printed sheets.

Q33. Printed sheets. All right. A. Strictly speaking, in the old terminology, they are all signatures; but that is not the modern nomenclature.

Mr. Watson: I offer in evidence a sheet printed on one side.

Mr. Free: I object on the ground that there is nothing to indicate what ink it was printed with.

(Marked Plaintiff's Exhibit 39.)

By Mr. Watson:

A33. Exhibit 39 is a sheet printed on one side only with oil inks. After this has stood for some time and is thoroughly dry, we print the back-up by putting the sheet through a press the second time.

Q34. By the "back-up" you mean the under side? A. Yes.

Q35. And the side which now is blank? A. Blank.

Q36. You said that it stands for some time before the second side is printed. Approximately how long, Mr. Busby? A. That depends on the heaviness of the printing. But it is usually about twenty-four hours before (848) it can be backed up, and then it is another twenty-four hours before it can be folded.

Q37. After the second side? A. After the second side is printed, that may be a period anywhere from twenty-four to thirty-six hours.

Q38. On this you are referring to now is what you previously said were with old oil inks, is that right? A. That is right.

Q39. How long do you think it would be necessary for this sheet to stand before the second side could be printed? A. Normally we would allow twenty-four hours.

Q40. I believe you noticed that counsel for defendant has a duplicate of this Exhibit 39, and happened to rub it and a lot of the ink rubbed off on his hands; is that correct? A. Yes. But that is because it has been recently printed, and that is what you would expect.

Q41. That is characteristic of these oil inks when they are recently printed, they smudge that way? A. They have to be handled very carefully when first printed.

Q42. Now, is that ink coming off on his hands an example of what you might call "offset", or "offsetting"; you used that term? A. Well, "offsetting" normally refers to ink coming off of one sheet onto another sheet.

Q43. I see. A. We generally keep our hands off of it.

(849) Q44. I see. I call your attention to another sheet which we picked up in the course of our tour through the plant, Mr. Busby.

Mr. Watson: I offer this printed sheet in evidence.

Mr. Free: I object to that also. There is nothing to indicate what ink it is, whether it is of the patent in suit or anything else.

Mr. Watson: It is identified in the patent.

The Court: The objection is overruled.

(Marked Plaintiff's Exhibit 40.)

By Mr. Watson:

Q44a. Will you please identify that printed sheet and explain what it is, and how it was printed? A. This sheet was printed with heat-set inks on Press 89.

Q45. In how many colors? A. It is printed in four colors on each side of the sheet. The perfected sheets are completely printed sheets, and are delivered thoroughly dry.

Q46. That is, they are delivered from the press as they are printed, thoroughly dry? A. They are delivered in the delivery of the press thoroughly dry; can be immediately used.

Q47. Yes. At what speed do they travel through the press, Mr. Busby. A. About 8000 an hour is the running (850) speed.

Q48. That is, 8000 impressions of this type? A. Yes, running speed; with a net production of over 5000 an hour on this one.

Q49. At what speed did the sheet of Exhibit 39 travel through the press when it was printed on one side? A. About 5000 an hour, with a net production of about 3000 an hour.

Q50. This sheet, Exhibit 40, was picked up as it was delivered from the press, was it not? A. It was picked up

just as it pulled through that delivery of the press, yes, sir.

Q51. And you found the inks to be thoroughly dry? A. Yes.

Q52. I call your attention now to some printed matter which appears to be in the size of a magazine sheet, and is folded.

Mr. Watson: I offer in evidence this printed sheet.

Mr. Free: I also object to this one, upon the same ground that there is nothing to indicate the composition with which it was printed, whether it comes within the patent in suit or not.

The Court: The objection is overruled.

(Marked Plaintiff's Exhibit 41.)

(851) By Mr. Watson:

Q52. (Continuing). Will you please identify Exhibit 41, and explain how it was produced, Mr. Busby? A. This signature was printed on Press 100.

Q53. That is what you call the signature, is it? A. Yes, sir, a folded signature.

Q54. I see. A. It was printed in four colors on each side of the sheet, and the printed sheet was then passed through a folder and the folded signatures delivered from the press, the point being that the sheets were dry enough to immediately fold, without offsetting.

Q55. Printed on both sides in the one press? A. Yes. This press runs at a running speed of 10,500 an hour, and with a net production of approximately six thousand to seven thousand an hour.

Q56. You are using the heat-set type of inks now, of course? A. Yes.

Q57. I call your attention to another signature.

Mr. Watson: I offer another signature sheet in evidence.

Mr. Free: I would like to make the same objection as to that one, as it has no connection with the patent in suit.

(Marked Plaintiff's Exhibit 42.)

By Mr. Watson:

Q57. (Continuing). Will you please explain that Exhibit 42 and explain how it is produced, (852) Mr. Busby? A. This 2-color signature was printed on a 2-color Life 64-page press. The press prints one side of the web, dries it and then prints the second side of the web and dries it, and then the web is passed through a folder and folded signatures are delivered from the press completely dry.

Q58. Is such a press known as a web perfecting press? A. Yes.

Q59. By "web", do you mean a continuous roll of paper fed through the press, as contrasted with separate sheets? A. A web press is a press which feeds roll stock from a web through the press and it stays in web form and is not either cut or folded until after the printing is done.

Q60. I see. It is a continuous ribbon of paper, is it not? A. That is right.

Q61. And that term, "perfecting", what does that mean? A. A perfecting press is a press which prints both sides of a sheet.

Q62. That is, it prints one side and then immediately prints the other side? A. It prints one side, and it prints the second side immediately afterward, with just a slight interval in between.

Q63. A split second. Maybe not so little as that? A. Well, the time between the first and the second side (853) depends on the speed of the press and the length of the web lead, but at most only a few seconds.

Q64. I see. A. The point is that when the sheets or signatures are delivered, they are perfected, completely printed. This press runs approximately 11,000 an hour

and we get a net production of seven or eight thousand an hour.

Q65. Using heat-set inks? A. Using heat-set inks.

I want to make this a matter of record, too. There is one thing I failed to mention in my other conversations regarding the development of this process.

There had been, prior to the development of this heat-set printing, quite a trend toward rotogravure printing and, as the result of our ability to print coated papers by this process, the tendency has been to go back to letter-press printing, particularly with color work. Life's advertisers and Times' advertisers and Sears, Roebuck and Montgomery Ward seem to prefer 4-color letter-press to 4-color gravure. We developed a lot of additional 4-color mail order business as the result of our ability to do this by this process—to print it by this process, I should say.

Q66. I call you attention to a signature.

Mr. Watson: Which I will offer in evidence as (854) Plaintiff's Exhibit 43.

Mr. Free: I make the same objection, as there is no connection with the patent in suit as indicated by this ink.

The Court: What is the probative value of this?

Mr. Watson: It gives you an illustration of precisely what is produced by this heat-set ink.

The Court: Whose heat-set ink?

Mr. Watson: Plaintiff's and plaintiff's licensed ink.

The Court: You want to specify the kind of ink that is used, don't you?

Mr. Watson: That will be connected up, of course.

The Court: I will admit it on the understanding that it will be connected up.

Mr. Watson: If you want the connection now we cannot go ahead today.

Mr. Free: No, it is not necessary to have the connection now.

(Marked Plaintiff's Exhibit 43.)

By Mr. Watson:

Q66. (Continuing.) Will you please identify that and explain how it is produced, Mr. Busby? A. That is a single-color heat-set signature. What I mean is, it was printed with a single color by the heat-set process. It was printed on a 64-page Life press, (855) perfected and folded on that press, at a running speed of approximately 12,000 an hour, and a net production of eight to nine thousand an hour.

Q67. I now offer in evidence a signature——

Mr. Watson: Which I will offer in evidence as Plaintiff's Exhibit 44.

Mr. Free: I do not like to interrupt all the time. May we let the record show that my objection continues throughout this deposition, because there is nothing to connect the ink up with these printing jobs?

The Court: Very well.

(Marked Plaintiff's Exhibit 44.)

Mr. Watson: A signature which I will ask you to identify and describe how it was produced.

A. This is a single-color signature for Time Magazine. It was printed on a 64-page Time press, perfected and folded on that press.

The running speed is approximately 14,000 to 15,000 an hour, and the net production about 10,000 an hour.

The reason that this speed is higher in revolution is that it is a smaller signature than Life, the web speed on the two types being approximately the same. By "web speed" I mean web speed in lineal feet per minute.

(856) Q68. Did you state whether this was printed with heat-set ink, Mr. Busby? A. It was printed with heat-set inks, yes.

Q69. I notice that this signature, Exhibit 44, bears date December 21, 1942. That I presume, means that it is the December 21st issue of Time; that is the one that will be brought out as of December 21st this year, is that right. A. Yes.

Q70. When will they go to the newsdealers or distributors, or whoever gets it? A. Well, it is being distributed all over the country now, for distribution on the newstands tomorrow and Friday.

Q71. I see. When did you go to press with this issue? A. Tuesday morning.

Q72. That is, yesterday? A. Yes.

Q73. Have you any idea how many pages there will be in it? A. No. I can give you a copy of a completed magazine, though, if you want it.

Q74. One is available, is it? A. Yes. I don't know accurately; that is why I do not answer that question.

Your question about the speed with which we produce Time Magazine, I think the best way I can answer that is by saying that we normally go to press Tuesday morning and that normally we are off the press sometime early Wednesday. This particular week we are printing some (857) of Cuneo's edition, so we are running a little longer than usual. Since you did raise the question, I state that.

Q75. The first sheet offered in evidence, that is, Exhibit 39, was that printed on a rotary press, the one with the old-fashioned oil ink? On one side only. A. Well, I think that in answering that question I ought to say that there is some confusion in the industry in the term "rotary press". It was not printed on a web-fed press. It was printed on a sheet-fed press. It was printed from curved plates.

Sometimes people refer to a "rotary press" as a sheet-press which prints from curved plates but feeds sheets.

A flat-bed press is a press which prints from a flat press and feeds sheets.

The term "rotary" does not refer to a web-fed press always, but usually it is, but people do not always refer to it as such.

Q76. The remainder of the exhibits, 40 to 44, inclusive, were all printed with web-fed rotary presses, is that right, those using heat-set inks? A. That is right.

I might say one other thing in this connection; that all of 1-color and 2-color Life and Time were printed (858) on heat-set inks, and a large percentage of the 4-color is also printed with heat-set inks. But some of the 4-color is printed with oil inks on one-side presses and then backed up with oil ink, a separate operation.

That answers that question, some of the color work is oil inks, you know.

Q77. Do you know, Mr. Busby, where you obtained the inks that you used for printing these Exhibits 40 to 44, inclusive, that you told us that you print with heat-set inks? A. No, sir. I know that we buy a great deal of our heat-set inks from I. P. I.

Q78. I see. Is that the ink known by the trade name "Vaporin" and called "Vaporin Ink"? A. Yes, that is.

Q79. The Levey inks are known by the trade-name of "Flash-Dri", are they not? A. That is right. The reason I say I don't know where these inks came from, we do not buy all our inks of the I. P. I. We buy some from American, and other sources, and I am not sure which of these inks were bought from which company.

Q80. I see. Are these heat-set inks stable on the press; that is, do they stay moist on the press while you are running, that is, on the rollers of the press? A. Yes. We do not have any trouble when we are running. Sometimes when we shut down, in order that they won't dry too soon, we have to spray the rollers——

(859) Q81. I see. A.——to stop the ink from drying on the rollers.

Q82. I see. How long would it take you to print Life Magazine if you used the method you described in connection with the Exhibit 39 which was printed with oil inks, that is, one issue? A. Oh, that would be pretty hard to say. If you filled this entire building clear full of equipment you might do it in the same length of time. It would take—let me answer that another way.

When you print with heat-set inks, we are printing the body at eight or nine thousand an hour and perfecting it; and if we were printing with oil inks, even if we used anti-offset solutions on the presses, we would have to—we would run at a much slower rate, print one side at a time, and then have to fold as a separate operation. The length of time it would take would depend upon how much equipment we were able to buy and put into the block. But even if we had the most equipment that you could get, it would lengthen out the time probably forty-eight hours, because we would have to have these drying times anyhow.

Q83. Could we get at it this way: Suppose that you had the same number of—for want of knowledge of a technical term, I will say—linseed oil ink presses or oil ink presses; suppose you have the same number of (860) these as you have of the presses using the heat-drying inks; can you tell us how long it would take then? A. No, I do not want to attempt to answer that question, because you could not print this job on this coated paper with rotary presses——

Q84. I see. A. —without offset.

Q85. I see. A. You would have to go to some other slower type of equipment, and what would develop there, I don't know. I do not want to answer that question because it would require a lot of engineering; with the use of oil I know it would take a lot longer then.

Q86. Much longer? A. Yes.

Q87. How long does it take at present for Life? A. We print around three and one-half million copies in eighty hours.

Q87a. Eighty hours? A. Of the current form, yes. That is, eighty hours right around the clock.

Q88. How large is this plant, Mr. Busby? A. Approximately a million square feet of manufacturing space. It is a square block and eight stories high.

Q89. How does it compare with other printing plants in size? A. I understand it is one of the largest printing plants in the world, and it has several millions dollars worth of new fast printing equipment.

Q90. You said that you had purchased some new (861) presses to take advantage of these heat-set inks, and you showed several of them to us.

I wonder if you could give us an idea of the cost of the presses, Mr. Busby? A. Well, I might say that the eight rotary heat-set presses that we bought for Life cost from one hundred and fifty to two hundred thousand dollars each. I do not want to give accurate figures, because that is a firm secret.

Q91. I see. I do not want you to divulge any secrets. A. I would like to have read what I said before.

Q92. How does the quality of the printing obtained through these heat-set inks compare with the quality of the printing obtained through the previous oil inks? A. It is approximately the same.

Q93. The heat-set inks, as I understand it, have enabled you to increase the output of a press; is that correct? Your printing operation is much speedier through the use of heat-set inks, is that right? A. Somewhat speedier, because we do not have to stop and wash up as often. But the main point is, that we are able to print on an entirely different kind of paper than we used to print on. Rotary presses used to have to print on softer papers, more absorbent papers, print papers and E. G.'s, English finishes, and now we are (862) able to print on coated papers. There is some increase in production.

Q94. By "coated papers", you mean to distinguish from absorbing papers, is that right? A. Yes. I mean by "coated papers" either a machine coated paper, where the paper is put on a paper machine, or enameled papers where the coating is put on as a separate process.

Mr. Watson: In order that the record will be complete, I have here a copy of Time Magazine of the issue of December 21, 1942, which I have purchased personally on a newsstand and which I note contains 112 pages.

The Court: What do you want to do with it?

Mr. Watson: I should like the record to show that that particular issue does contain 112 pages.

Mr. Free: I will admit it contains 112 pages, and we can dispense with the magazine.

Cross examination by Mr. Free:

Q95. I understand you have some rotogravure presses in the plant? A. Yes, we have.

Q96. How does the speed of the heat-set press compare to the rotogravure press; are they about the same? A. Yes, they are. On our rotogravure presses, (863) those that we have print single-color and 2-color; so I have no firsthand knowledge of the speed of 4-color rotogravure presses.

Q97. I see. But insofar as output of the two is concerned, with equal color combinations, the rate is about the same? A. That is right.

Q98. But on these rotogravure presses you use heaters to dry the ink after the web goes off the press? A. Yes.

Q99. And that heater causes the solvent in the ink to be driven off in the same way as the solvent in the heat-set ink is driven off; is that right? A. No. I do not think it is the same way.

Q100. But you have hoods with which to draw off the vapors, do you not, each press? A. Well, we draw off the

vapors on a rotogravure press; but there is nothing like the amount of fumes or the problem involved that there is with letter-press drying.

Q101. I see. Do you know whether or not your rotogravure presses have closed fountains to retard evaporation? A. They do not have closed fountains. Closed fountains are specially patented and are only used by people who are licensed to use them, and we found that we can run at our speeds without closed fountains. We have no problem there.

(864) Q102. But it is a fact, isn't it, that in the fountain the rotogravure ink is much more volatile than the heat-set ink? A. I cannot answer that question. I wish that I could. But I practically cannot. You might ask our ink man that question if you want to.

Q103. In a sense, therefore, the rotogravure ink is heat-set also, is it not? A. Well, let me answer that another way. The rotogravure process was a process which was in existence; nothing like that had ever been developed for letter-press printing; and then Levey and I. P. I. came along and developed something for letter-press printing that is superior to what we had on rotogravure printing. But it is not similar; it is a different process.

Q104. You distinguish between the two in the method of printing; that is, one being letter-press printing, and the other being rotogravure printing; is that right? A. Well, I distinguish between them even more than that, because the rotogravure inks could not be used for letter-press printing, and the letter-press inks could not be used for rotogravure printing. They are entirely inherently different.

Q105. What I am getting at, however, is the process of drying the ink is about the same; you apply the ink to the web and after it is applied to the web you apply (865) heat to the printed web, and in that way the ink is dried on the web. A. Well, I believe it is entirely different because

these processes that we use for drying the rotogravure ink would not work at all for heat-set printing; and where other people tried to use it, they were not successful with it.

And the process that we use on letter-press printing would be absolutely fatal if we tried to apply it to rotogravure printing, because you cannot use gas or flames around rotogravure because they are highly inflammable, and you would burn the place up.

Q106. But you do dry rotogravure inks with hot air, do you not? A. They use hot air.

Q107. What I am really getting at, in these things the processes are similar; that is, you apply the inks to the web, and then the ink is dried by heat, whether it is gas, flame or hot air; nevertheless, the drying is done by heat, is that right? A. Yes, but rotogravure printing is usually done on papers that are not coated papers like heat-set printing. The point I want to make is, that they are entirely different processes. They are inherently different. We have to use different drying equipment. We tried to use the same kind of heating equipment, in a similar thing, and it was wholly inadequate for the other.

(866) Q108. As I understand it, you said the letter-press ink used with the heat-set process differs from intaglio ink. In what way, can you tell me? A. No. I think an ink chemist ought to answer that question.

Q109. And therefore, you do not know, not being a chemist, what was in the first inks you received from I. P. I., do you? A. I don't know what was in those inks. I only know what they did for us and how they helped us solve our problems.

Q110. Now, the first inks you got from I. P. I. did not work very well, did they, on the presses? A. Well, they worked so well on Press 2 that we were willing to undertake a contract for a new magazine where we put ourselves —obligated ourselves to print 400,000 copies a week. I thought they worked very well.

Q111. Now I have reference to the inks you received from I. P. I. as early as November, 1935, not those that you used later on Press No. 2. A. We did not get any real chance to try out heat-set inks and give them a proper trial until we put in the I. P. I. experimental equipment on Press No. 2, when we gave it a real trial, and it was almost immediately successful.

Q112. When was that? A. I will have to check that date.

Q113. It was after, considerably after November, (867) 1935, however, wasn't it? A. I think it was immediately after November, 1935; that is, December, 1935, to early in 1936; that we were printing on Press No. 2 because it was the result of these tests that we made our plans looking toward Life Magazine's contract in the fall of 1936. I do know that the I. P. I. inks were considerably better than the early inks got from Levey.

Q114. Now, this equipment which I. P. I. helped you install was not effective at first, was it? A. It was quite effective.

Q115. You yourself made many experiments and improvements on the heater after that, didn't you? A. Not on that heater. That equipment and that heater are still intact, almost the way we used it. We did develop heat equipment of our own design on subsequent press installations, so that we have done a lot of improving of heating equipment. We have worked out a lot of improvements ourselves on subsequent equipment, and we bought new presses.

But Press 2 is a press that is almost forty years old, and as the result of this heating equipment we put on it, it has been a very productive and very useful press. It is the oldest press in the house today.

Q116. So what it was necessary for you to do to make this one process effective by that Press No. 2 was (868) merely to add a heater; is that right? A. We may have

worked out some mechanical changes for the web leads, I am not sure of that.

Q117. That was the principal change? A. That was the biggest thing we did.

Q118. Was that a gas flame heater? A. It was a gas heater, yes, sir.

Q119. How hot do those heaters run, around 1500 to 1700° F., don't they? A. My engineers tell me that they run around 1500 to 1700 degrees, Selas Heaters do.

Q120. The gas flame is right next to the web; is that right? A. Yes—no, that is not right. The Selas Heater itself produces an intense heat, and a flame blows on the web and burns off the vehicle and the fumes; but most of those heaters, it is not a flame that creates the drying.

Q121. As your presses start up cold, the rollers gradually increase in temperature owing to the tack of the ink and friction, do they not? A. Yes, the rollers and the ink carriages warm up as we use the press.

Q122. How hot do they get, do you have any idea? A. No, I do not know, I am sorry. That would depend on the temperature in the room. If the room was 100° F., the rollers might go up to 120 or 130° F.

Q123. In the summer, then, they would run much higher (869) than that? A. No, I don't think so.

Q124. Now, did you ever have any trouble with the ink rollers cracking, with the first I. P. I. ink that you used? A. I don't know about that.

Q125. Do you know what those ink rollers are composed of? Are they glue and glycerine, or rubber, or what are they? A. Well, we use various kinds of rollers.

Q126. When you spray the ink rollers, what is in the spray, do you know? A. Well, I know that we used to shut down and if we had trouble of drying, we would spray a little kerosene on. I don't know what we are using now.

Q127. Have you ever had any trouble with the web sticking to the rollers and wrapping around them and

causing a shutdown to clean them out? A. You mean a web break?

Q128. Yes; owing to sticky rollers. A. Well, the web does not come in contact with the rollers. The web only comes in contact with the printing face and the impression cylinder. The web never comes near the rollers.

If you are talking about——

Q129. All right. Sticky printing plates sometimes cause the web to break and tear, do they not? A. I do not think we have had any serious trouble like that.

(870) Q130. When you do, you simply spray the plate and that causes the plates to become less sticky; don't you use a Flit gun for that purpose? A. Well, if we get a web break, we stop and wipe up the press, which takes about fifteen minutes, and then we might after that wash up the press.

Q131. I see. That is to get off the gummy ink that has dried in the meantime? A. Yes. If we are only down for a few minutes, we spray the plates so the ink won't dry.

Q132. When did you begin printing commercially with heat-set ink? A. Early in 1936, we printed commercially on Press 2 with heat-set ink. I have not got the exact date.

Q133. I understand you were handed a subpoena before you testified? A. Yes, I was.

Q134. You would have testified as freely as you have without a subpoena, would you not? A. No, I would not without a subpoena. My reason for that is, I do not believe the differences between ink companies was any of my official business.

I do not see why I should, of my own free will, without a subpoena, enter into this case.

Q135. So you asked for a subpoena, did you not? A. I did not ask for a subpoena, no, sir.

(871) Mr. Watson: That is everything on the Busby deposition.

Mr. Free: As to this whole deposition I would like to note my objection on the record again, that the ink has not been connected up, and since it has not been and if it is not, then it is entirely immaterial.

The Court: Certainly the inks that have been introduced here are what are known as the heat-dried inks, and this deposition is confined solely to how they act under actual printing conditions, so I think I will overrule the objection.

Mr. Free: I would also like to note that Mr. Busby's deposition seems to be directed entirely to the process, and the process is expressly excluded in the patent in suit, which is confined to the ink.

The Court: To the chemical composition?

Mr. Free: To the physical composition of the ink.

The Court: What do you say to that?

Mr. Watson: I do not think it is confined to the process at all. It is confined to what the ink does in the actual production. Here is an ink and what does it do?

The Court: Your patent does not say anything about what it will do.

(872) Mr. Watson: The patent gives a useful article. We are showing that it is useful, I mean, if it were not a useful article we would have no patent on it.

Mr. Free: The patent says here, so that it is plain to us, line 28 of the second column of page 2:

"This method of printing is not claimed herein as it forms the subject matter of my co-pending application," serial so and so, filed so and so. That makes it plain that this patent definitely is not a process patent but is directed solely to the ink, therefore any testimony having to do with the process is irrelevant and immaterial because it relates to the

second application, which is here named as a separate invention.

Mr. Watson: If you will concede that the printing ink has revolutionized the typographic printing industry, we can dispense with all this sort of stuff.

Mr. Free: I won't concede that. The butyl carbitol in the patent in suit is a failure.

The Court: We will let it stand.

Mr. Free: At this time, however, to make the line of demarcation clear between the patent in suit and this application that this patentee refers to, I would like to offer in evidence as Defendant's Exhibit M-2 the certified copy of the file wrapper of the (873) application Serial No. 15,944, filed April 12, 1935, referred to in line 30, column 2, page 2 of the patent in suit.

(Marked Defendant's Exhibit M-2.)

The Court: All right.

Mr. Free: This application, your Honor, was obtained by the plaintiff here, and the subject matter is now public property as of December 29, 1940, as appears on page 40 of this Exhibit M-2, which also makes it plain that the process is no longer property of the plaintiff here.

---

(874) Deposition read in evidence of LEONARD R. HECKER produced as a witness for plaintiff, who, being first duly sworn, deposed and said:

Direct examination by Mr. Watson:

Q1. Where do you reside, Mr. Hecker? A. 215 Walnut Place, Chatham Village, Upper Darby, Pennsylvania.

Q2. What is your occupation? A. Superintendent of plants, Benjamin C. Betner Company.

Q3. And your office is located here? A. Main office is in Devon.

Q4. And that is where you exercise your duties? A. No, my duties—I mentioned plurally that is; plants—cover all the plants, that is, the one here in Devon, one in Strafford, which is just adjoining, one in James River, Richmond, Virginia, and the last one is Oklahoma City.

Q5. How long have you occupied that position? A. Well, in the full sense of the word, for the last fifteen months; to a limited extent, for the last eight years. In fact, it can't go back quite that far, either, because it happened as the plants were added on. Now, let's see when the first would be—about 1938; wouldn't go back eight years.

Q6. Previous to that what was your position? A. Superintendent of printing.

Q7. For the Benjamin C. Betner Company? A. For the Benjamin C. Betner Company.

Q8. What is the business of Benjamin C. Betner Company? (875) A. Benjamin C. Betner Company is engaged in the manufacture of paper food containers. To bring it up to date, we use the terminology for Lend-Lease, Army and Navy, and domestic consumption.

Q9. What type of containers are those? That is, are they paper, tin, or cardboard? A. Paper.

Q10. Paper? A. Paper containers, yes. I thought I outlined that.

Q11. Would you mention some of the products for which you manufacture these containers? A. Well, the containers are used for dehydrated foods, flour, coffee, dried vegetables and frozen foods—let's see—shipping containers and liners for cartons.

Q12. Is the paper that you use for making these containers printed upon by you? A. Mostly it is printed, yes, majority of it.

Q13. What sort of process do you use for that printing? A. Well, we have aniline, rotogravure, high speed

rotary printing presses—do you want the name or the model?

Q14. Not necessarily, just the types. A. Just the general type—flat bed cylinder presses and job presses.

Q15. The high speed rotary press is the press which is used in what they call typographic printing. A. That is correct.

(876) Q16. What sort of inks do you use on those presses? A. The inks which we use on those machines are what we call heat reactive, and the particular trade name of the product we use is called Vaporin.

Q17. You purchase them from International Printing Ink Company? A. The ink is purchased from Interchemical, from I. P. I. I was going to enumerate our own converting, but I don't think that is necessary, probably. See, we do use those bases, too, and do our own color matching, but it is still the same basic formula.

Q18. I see. Are those inks that you have referred to as heat reactive stable on the press when the press is being run? A. Yes, they have proven to be very stable as far as general operation is concerned.

Q19. And do they dry immediately on the application of heat? A. Yes, they dry and are free of offset immediately upon the application of heat.

Q20. How long have you been using such inks? A. You don't realize, when you start to figure back—I think it was 1934 or '35.

Q21. Did you change from another type of ink when you adopted these heat reactive inks? A. Yes, we changed over from what was called linseed type inks at the time we made the conversion.

Q22. Why did you make that conversion? A. Conversion (877) was made to eliminate the use of slip sheet, primarily, which was an operation of interweaving a non-offset type of stock between each successive wrap, in the case of rolls, with the printed matter, and—well, you can

ask your next question, if you have one, I guess. There is no use of me telling a story.

Q23. The slip sheet was necessary in the case of linseed ink? A. Slip sheet was necessary in the case of linseed inks to make it possible to unwind the rolls after the inks had dried, and at the same time protect the surface of the ink during its drying interval.

Q24. Are those presses that you have referred to web presses? A. They are what are called rotary web presses.

Q25. That is, the paper is fed into the press in the form of a continuous ribbon? A. That is right.

Q26. Then what happens to it? A. It flows out after printing and is rewound on another spindle into a roll.

Q27. That is what they call the rewind roll? A. That is right.

Q28. In using this slip sheet, was that also a continuous ribbon of paper? A. That was also a continuous ribbon of paper.

Q29. And precisely how did it operate? Did it travel with the printed roll, or the printed web? A. It traveled from an auxiliary spindle and unwound from its own roll (878) and rewound into the freshly rewinding roll, which was the printing.

Q30. Does it travel on the printed side of the web, in contact with the printed side of the web? A. Well, it so happens that it don't matter.

Q31. It can be either way? A. Because—actually, it did, it did travel with the printed side, but it doesn't matter, because it is still a sheet of the stock, that is, the printed matter, on each side of the web.

Q32. What does it do, prevent the printed side of the web from coming in contact with the opposite, unprinted side? A. That is correct, yes.

Q33. Is this slip sheet a sort of a blotter, or is it an ink-repellent paper? A. It is an ink-repellent paper, and it took two general types. One was the wax impregnated

sheet, which resisted the action of the ink, and another version was the flint or garnet covered abrasive paper, which also resisted the contact of the ink.

Q34. Did the necessity for using such a slip sheet have disadvantages or not? A. It had considerable disadvantages. First, it induced an additional operation of rewinding the slip sheet into its separate roll and the printed matter into its separate roll after the ink had become dry. That meant additional equipment for the separating. It was an expensive operation, it resulted in (879) an inferior grade of printing, due to smudging, and had a slowing down effect on the output of the printing press, caused by the necessity of changing rolls oftener, due to the more rapid build-up of the finished diameter, caused by the two webs being brought together for rewinding.

I think they are the main points as far as the bad features of it are concerned.

Q35. And has your conversion to the heat reactive type of ink eliminated those disadvantages? A. The conversion to heat reactive type inks has eliminated all those disadvantages, with the additional feature that we have gotten an improved quality of work in the form of higher gloss and a more even gloss throughout the entire width of the sheet, which was not the case before, due to the inks drying faster along the edges of the web and slower in the center area. A lot of that comes back to me, now, thinking of it.

Q36. How long did it take the web printed with the linseed type inks to dry? A. The general practice was to leave the linseed printed rolls for twenty-four to thirty-six hours before rewinding, and another few hours before it was actually converted after rewinding.

Q37. What do you mean by "converted"? A. Converting is interpreted as meaning the conversion process wherein (880) the roll of paper is placed on a converting machine—in this case a bag machine—and cut off into individual units or impressions, and formed into bags.

Q38. Are these heat reactive inks used on the same presses that you previously used for the linseed type ink? A. Yes, they are used on the same machine.

Q39. Did you make any change in those presses to permit you to use the heat type inks? A. There was no changes made in the press itself to use the heat drying inks.

Q40. Did you use any equipment for drying them, heaters? A. The drying equipment was installed for the drying operation.

Q41. Nothing else was done to the press? A. No.

Q42. Except, of course, you could eliminate the spindle for the slip sheet, right? A. Well, that was—we just don't use it any more. They are around.

Q43. Would you say that the change to the use of heat type inks has resulted in an economy to your company as printers? A. Yes, it has resulted in economy, effected a saving all along the line, labor and materials, particularly.

Cross examination by Mr. Free:

XQ44. When did you first hear of heat reactive or heat-set inks that you have been talking about? A. The (881) best date I can give you on that, due to the fact of the lapse of years, is that it was in the early 1930's, I don't know exactly the year, now—possibly in about 1932.

XQ45. And what was the source of that information? Did some salesman call on you to sell you or attempt to sell you heat-set inks? A. The source of that information was, I believe, Mr. Cray, of Cray-Finne Company.

XQ46. Any other callers in respect to heat-set ink, for instance, from the Levey Company, about that same time? A. I had no direct contact with or any other information from Levey Company at that time. I don't know anything more than that, don't know any details involved. There was rumors of various things, I don't know just what year, I don't know whether it was before that or afterwards—it must have been afterwards.

XQ47. And you probably heard of the printing done by Curtis Publishing Company with Levey ink at that time, which was of this same heat reactive type, is that right? A. No, the first knowledge I had of Curtis Company was after we were actually operating here. The only knowledge I had previously of Curtis was that they were using a tympan offset sheet.

XQ48. What solvent is used in these inks you have (882) been talking about, heat-set inks? A. Well, I wouldn't say I would be qualified to actually say that, as to what solvent is. The ink comes to us already formulated, and I have nothing to base an actual statement on.

XQ49. But you do know that there was a change in the solvent from time to time? A. There may have been. I have no way of actually knowing that.

XQ50. For instance, you could tell that by the smell of the ink, could you not? A. The inks generally have been fairly free of odor, as far as any pungent odor is concerned.

XQ51. Do you have a hood for drawing off the fumes— A. Yes.

XQ52. —after the heater? A. Yes, we do have, the heater itself is designed with an exhaust system built in, which would account for some of our lack of definite knowledge on whether there was any change in the smell.

XQ53. You use the same kind of a hood, substantially the same kind of a hood, on the heat reactive presses as you do on the rotogravure presses, do you not, for drawing off the vapors after the heater? A. No, it is slightly different, that is, different from the generally accepted gravure hood, which, if my memory serves me completely, is more of an over-all canopy effect, whereas (883) on the driers which we operate, the web passes through a chamber which has exhaust ducts built right in, as well as the heat ducts for blasting the sheet with the heat, and those exhaust ducts are piped to an exhaust to the outside of the building.

XQ54. You have never detected any odor that could compare to a kerosene odor in connection with your heat reactive inks, have you? A. Not to the best of my knowledge. That would be a pretty hard question to answer, however, because we have quite a bit of kerosene around our press room at all times, and whether there would be a possibility of intermixing a smell of that nature would be hard to determine.

XQ55. Some of your food wrappers are necessarily printed with an odorless ink to preclude after-odor, are they not? A. That is right.

XQ56. Is there an odor at all to the inks that are used, heat-set inks that are used for printing the food wrappers, after printing? A. Nothing that would be objectionable, from our experience with the customers and the ultimate use of the containers.

XQ57. What is that odor, although faint? Can you describe it? A. The only way you could describe it would be to interpret it as sort of having a resin odor to it.

(884) XQ58. I understood you to say, did I not, that you operated rotogravure presses also? A. That is right.

XQ59. And there the web is a continuous ribbon? A. That is correct.

XQ60. And the ink is applied to the web? A. Ink is applied direct to the web.

XQ61. And then the solvent is driven off by heat, usually hot air? A. That is correct.

XQ62. How about the quality between your rotogravure printing and your heat-set printing? Can you compare those? A. Well, we can't compare it except from the printer's point of view, which would be that the rotogravure in our case is a simplified operation, it isn't on a par with our heat reactive letterpress printing. The rotogravure which we conduct is a simplified, two-color operation, and no processing of colors worked out, or anything of that nature, whereas on our heat reactive letterpress

set-up, we have set up and already have produced a high quality type of letterpress printing, embodying process, half tones, and so forth.

XQ63. The speeds of output, that is, feet per minute are about the same, are they not, for your rotogravure and heat reactive printing processes? A. Well, in our case, our heat reactive type printing is faster than our rotogravure. That would not necessarily (885) be true in all cases, however.

XQ64. There is no limitation on speed on your rotogravure press, however? A. There is on the machine we have.

XQ65. But that has nothing to do with the drying capacity of the ink, for example, it is a limitation of the press, as I understand it. A. No, as a matter of fact, in our case it is a limitation on the drying equipment. The speed which we operate our gravure press is balanced out with the amount of space we have available for the action of the heat on the gravure ink, and limits us to a definite speed, which is below our letterpress printing.

XQ66. What degree of heat do you use in your rotogravure presses, approximately? A. Approximately 200 degrees Fahrenheit.

XQ67. And what degree of heat do you use in your heat-set presses, approximately? A. 275 degrees Fahrenheit.

XQ68. Is that a gas flame or steam drum? A. That temperature is obtained by the use of a gas flame.

XQ69. In both instances? A. Not directly applied to the paper itself, or the ink, but to generating hot air.

XQ70. And that in each case is blown on the web? (886) A. That is blown on the web. There is one additional feature, which I have lost contact on for the moment, and that is, we do have one printing press in Oklahoma City, in which we direct the actual gas flame against the printed web.

XQ71. When you first obtained your heat reactive inks in 1934 or '35 you had a little difficulty with them in so far as stability was concerned, did you not? A. Only in the sense of obtaining a superior—cross that out, I will start over again. Will you ask the question again?

Mr. Free: Read that question back to him.

XQ72. And you started your answer with, only in so far as— A. Only in so far as the desire on our part to obtain a result showing a definite and positive improvement over any of our previously used linseed type inks, in the nature of gloss and sharpness of print, and so forth.

XQ73. And that lack of stability was corrected in later inks that you obtained from I. P. I., was it not? A. We didn't actually look upon it as a lack of stability as much as a desire to have available something superior to anything that we used before. Actually, by comparison, they were very nearly matched in the early stages, it was only on the desire on (887) our part to obtain something superior to anything that we had ever had that we requested development.

XQ74. How does stability or lack of stability manifest itself on a press? A. Well, the general consensus of a lack of stability on a printing ink on a printing press would take some simplified form, such as easy distribution, non-drying, or setting on the rollers while the printing press was running, and what is known as printability or sharpness of the impression.

XQ75. Now, in reference to the tendency to dry on the rollers, that was one of the difficulties with the first heat-set inks you obtained, was it not? A. We didn't seem to have any trouble along that line, possibly due to the high speed operation of the printing equipment. It was used on our so-called high speed rotary presses right from the start.

XQ76. The reason I asked that question is that Vaporin inks have changed since they first came out, and now con-

tain a solvent which does not tend to evaporate as rapidly as the original inks, and my understanding is that prior to the change there was some lack of stability. The change took place about 1936. Does that accord with your recollection? A. I haven't anything to base a conclusion of that nature on.

XQ79. How fast do you run your presses? A. Our (888) presses run upward of three hundred feet a minute.

XQ80. And after an hour of operation or so your ink rolls become pretty hot, due to friction and tack, do they not? A. Slightly warm to body temperature.

XQ81. About what temperature would that be? A. We have never actually taken a temperature reading of that and therefore I couldn't give you any actual figure on it.

XQ82. Thirty or forty degrees above room temperature, for example? A. It may reach a temperature as high as that.

XQ83. What sort of rolls do you use on your presses, composition or rubber? A. We use composition and synthetic rubber.

XQ84. Did you ever have any trouble with the composition rollers when you first tried the Vaporin ink? A. No.

XQ85. No cracking, due to drying out? A. No.

XQ86. How long would the composition rollers last with Vaporin ink? A. That figure was quite flexible, due to some equipment running twenty-four hours a day, and other equipment only running eight and nine hours, and there was an effect created there of shortening down the life of the surface of the roller by more constant operation, but in all cases it seemed to just about balance (889) out with what we had used in the—balance out with the life that we had accomplished or achieved when using linseed inks.

XQ87. What rollers did you have on the presses when you first started out with Vaporin inks? Were they composition or synthetic rubber? A. Mostly composition.

XQ88. Never had any trouble with drying out? A. Nothing any different than we did with our linseed inks, where we would have a dead area on the end of the roller which would cause the ink to set up.

XQ89. What sort of composition were those rollers, do you know? A. Well, there was the so-called glue, glycerin and molasses composition.

XQ90. That would mean to me that you did not begin using Vaporin ink until 1935, is that about right? A. What would that mean to you?

XQ91. Because the original Vaporin inks, as was acknowledged by the patentee in the suit, affected the glue and glycerin rollers by drying them out, so that when you tell me that you have had no difficulty with glue and glycerin rolls, that means you did not use the original ink. I think, therefore, that when you were in doubt as between 1934 and 1935, as having started, you most likely started in 1935, is that right? A. The (890) only way to get a positive date on that would be to check our records back and verify which year it was.

XQ94. Could you do that? A. That information may be available. I can look.

XQ95. Well, I wish you would, but in the meantime perhaps you would get someone started on it.

Mr. Free: It is stipulated that the first sale of Vaporin ink to your company was July 1, 1935, so you don't have to look up the records.

Mr. Watson: In the first week in July, 1935.

Mr. Free: All right.

The Witness: That was when we first went into it, productively, was it?

Mr. Watson: You have no objection to my showing him this?

Mr. Free: No.

The Witness: Yes, that is right, that was the job.

XQ96. About how much ink do you use a year or a month in these plants? A. Of all types?

XQ97. All types, yes. A. Somewheres in the neighborhood of about seven thousand pounds.

XQ98. A month? A. A month.

XQ99. And has the figure remained the same over the last five or six years, say? A. Let's see, that would (891) put us back to '38—yes, it would be about the same.

XQ100. Now, I wish you would divide that amount into percentages for the various kinds of ink, approximately. A. Well, let's see—I guess that figure is off about a thousand pounds. Will you allow me a correction there, of eight thousand?

XQ101. Sure, all I want is information.

Re-direct examination by Mr. Watson:

Q102. What should it be, eight thousand instead of seven? A. It should be about eight thousand pounds, yes, covering all types. About ninety per cent of that figure is the heat reactive type inks, and about three per cent in linseed types, and the other seven per cent would be in spirit inks, such as aniline and gravure.

Re-cross examination by Mr. Free:

XQ103. I think you said something about doing some color matching here of your own. A. That is right.

XQ104. How long have you been doing that? A. I think it was 1934, we started.

XQ105. And you buy the materials from what source? A. At the present time they are bought from Interchemical.

XQ106. Have you ever bought Vaporin type inks from any other source than Interchemical or I. P. I.? A. You mean the heat reactive type?

(892) XQ107. Yes. A. Yes, we have bought some from other sources.

XQ108. Who are they? A. Frederick H. Levey Company—that was the only other, come to think of it, I thought there were some others, but there weren't.

XQ109. How long ago was that? A. Well, as recently as the last year.

Mr. Free: I would like to make the same objection to this Hecker deposition as before, your Honor, that it has not been connected up with the patent in suit and it is largely a process which is excluded by the patent in suit.

The Court: Very well. Objection noted.

---

(893) Deposition read in evidence of EDMOND P. JOY, produced as a witness for plaintiff, who, being first duly sworn, deposed and said:

Direct examination by Mr. Watson:

Q1. State your name, please. A. Edmond Patrick Joy.

Q2. Where do you reside, Mr. Joy? A. 1258 Asbury Avenue, Winnetka, Illinois.

Q3. And what is your occupation? A. Printer.

Q4. With what company are you? A. The Regensteiner Corporation.

Q5. What is your position at this time? A. Plant Manager.

Q6. How long have you been so employed? A. Approximately seven years.

Q7. What printing is done by the Regensteiner Corporation? A. Well, we do a great variety of commercial work, both letter-press, offset, some publication printing, and some specialty work in the way of playing cards, and that sort of things.

Q8. What publications do you print? A. Well, we print Esquire Magazine practically in its entirety, and we print

part of Coronet Magazine, and handle the binding of same, and we have two or three small trade magazines that come out of Detroit. I do not recall the names of them.

Q9. What type of presses do you use in the printing? A. Well, we have a variety of presses: regular 2-color—(894) 1- and 2-color Miehle presses, and one- or two-color offset, and part of Esquire is printed with 2-color rotary presses.

Q10. Is that printing what is called letter-press printing, or typographic? A. Letter-press printing.

Q11. Letter-press and typographic are synonymous, aren't they? A. Yes, I would say so.

Q12. Do you use rotary web perfecting presses in your letter-press printing? A. We have one such unit, yes.

Q13. What sort of inks do you use in your letter-press printing? A. Well, by that do you mean whose inks, or generally——

Q14. No; the type of inks. A. The types of inks? Well, in our regular letter-press, or flat department we use regular linseed varnish base inks.

On our rotary press, practically everything we run through is from heat-set type of inks.

Q15. How long have you been using the heat-set type of inks? A. Let me see now. Since May of 1939, I believe.

Q16. In what printing do you use such inks? A. Well, in the main we use it in running 1- and 2-color work for Esquire Magazine; although we do have some custom work in the way of children's books that we run with those inks occasionally.

(895) Q17. What types of inks did you use for that kind of work before you adopted the heat-set inks? A. Well, that work was primarily printed on flat-bed presses, using linseed varnish base inks, 1- and 2-colors.

Q18. Why did you change over to heat-set inks? A. Well, it was more—a faster method of production, primarily, and enabled us to change the general manufacturing procedure, which resulted in decreased costs of production.

Q19. Is speed an important item in your printing? A. Yes, it is very important, and it is particularly important in a publication because it enables us to give the publisher later closing dates, which apparently are as important to them in offering their advertisers more extended periods of closing their ad; it allows the advertiser later closing dates.

In other words, they do not have to get their "copy" in so early to meet certain issues.

Q20. Is greater speed in printing an economy to you as a printer? A. Well, speed itself, simply as speed, I would not say results in economy. But the use of the type of inks we are using, which results in greater speed, enables us to print certain types of paper by the method we are now printing: formerly we had to print at much lower speeds, and it results in much saving to us.

(896) Q21. That does result in much saving to you? A. That is right.

Q22. Are the heat-set types of inks that you use stable on the press; that is, do they stay moist on the press? A. They stay moist for a certain period of time. Our experience has been that the amount or length of time of their stability is tied in pretty—mostly with the drying qualities. In other words, an ink which we say we could class successfully at 16,000 impressions an hour, would not remain open as long as one that flashed or dried at a lesser speed, at 10,000 impressions, and particular inks that we run we find will stay open for two to three hours.

In other words, we do not have to wash the press when we have an occasional shutdown.

Q23. When you say they stay open for two or three hours, does that mean a shutdown or during operations? A. Oh, as far as operation of the presses is concerned, they stay open indefinitely. Where we are concerned, we have to shut the press down occasionally to fix up any adjustments or make-ready, or change of plates, and that sort

of thing, and it is a benefit to us to have the work stay open, so we do not have to go in there and wash up the rollers, as I do not have anything to dry on the plates during these shutdown periods.

(897) If we are shut down for an extended period, say six or seven or eight hours, something of that kind, we naturally, of course, wash the press up.

Q24. Are these inks dried immediately on the application of heat? A. Yes. It is almost instantaneous.

Q25. They emerge from the press perfectly dry? A. Yes. The printed signatures come out perfectly dry, as we know them as being dry.

In other words, they can be handled immediately without danger of smudging or offsetting.

Q26. Do I understand you to say that you use a perfecting press in connection with these heat-set inks? A. Well, the press we run is a 4-unit 2-color press. In other words, it prints two colors on each side of the web and delivers folded signatures.

Q27. Could you use such a press in printing with the linseed varnish inks? A. You could use such a press, but you could not print the type of paper we print on it at the speeds we print.

Q28. Suppose you were going to print the type of paper you are now using; could you use linseed varnish inks on that? A. I know of no successful application of linseed varnish inks on coated paper where they are using rotary equipment.

Q29. What is the reason for that, Mr. Joy? A. Well, (898) coated papers are highly finished. They have a glazed surface on them. They are papers that have very little qualities of absorption, with the result that the ink lies up on top, and unless you have an ink that can be dried by some means, such as heat, as we use in these Flash-Dri inks, it does not set quick enough on the web so that you can fold the work as it is being delivered from the machine;

and you run into a lot of offset and that sort of thing, smudging.

As an example of that, with a different concern, a few years ago, we used to run so-called super-calendered sheets, which are the next grade down, we will say, on the coated sheets, as far as hardness of surface, and so forth, on rotary presses. But we were only able to run them at a third or a quarter of the speed you are able to get today by the use of these heat-set inks.

Q30. Is it necessary, with the use of these linseed varnish inks, to store the sheets for a period of time to permit the ink to become sufficiently dry for handling, such as folding? A. Well, in printing on flat-bed presses, it is, yes. It is, and the length of time will vary; but it is seldom that the sheets will be safely handled in less than four hours' time, and very often the time will run up to twenty-four or more.

Q31. Is there a delay between the time when one side (899) is printed and the other side is printed? A. Yes. When printing flat-bed with the regular linseed inks, you do have to wait until the ink sets. These types of inks, I am not very familiar with the chemistry of the thing. It seems to be more a question of evaporation and setting, and there is no time element involved there; there is a very distinct advantage in many types of being able to back your sheets immediately, or back them up, as we say, immediately after they are printed on the first side.

Q32. The phrase, "back the sheets up" means printing on the second side, doesn't it? A. Yes, to run them through on the reverse side.

Q33. Such printing as you described has been performed with flat-bed press, is that correct? A. Well, on that particular work, particular type that we are now running rotary, using heat-set inks, that was formerly printed on flat-bed presses.

Q34. I see. How long would it take to do that by flat-bed presses, what you can accomplish on that rotary press.

could you make a comparison on that? A. Well, fairly—yes, I could make a fairly accurate comparison. When we printed on a job with flat-bed presses, we were able to print twenty pages at a time, at approximately a rate of around 1,100 an hour. The way we are running (900) now on 2-color rotary, we print sixty-four pages at a time, at the rate of approximately—oh, no, around 7,000 an hour; and in addition to that the work which we formerly ran flat-bed had to be folded; whereas the work we run on the rotary comes out as folded signatures.

In other words, we will say, 20 pages at a thousand an hour; that is 20,000 pages an hour; and 64 pages at 7,000 an hour is how much? Figure it up; 448,000 pages, something like that.

Q35. Do you have the delay between the first and the second side printing and between printing and folding in the rotary with heat-set inks, such as you had with the flat-bed presses you have spoken about? A. No, there is no delay there because the rotary press is a perfecting press. In other words, you reverse the first side and immediately print on the reverse side and the signatures are delivered folded.

In other words, they are ready for binding as it comes from the press itself.

Q36. Has there always been a demand, so far as you know, for an ink that will dry immediately after being printed, or could be dried immediately after being printed, which would still be stable on the press? A. Well, as long as I have been in the printing business, which covers around twenty-four years, there has been such demand.

(901) One of the biggest headaches that all printers have had is getting away from offset, slip-sheeting, smudging, and that sort of thing.

There has been development in the flat-bed field. There was a time when we used to have to slip-sheet.

Q37. What do you mean by that, Mr. Joy? A. Well, when work was delivered, a sheet would come out on the

delivery end of the press, and a man would have to stand over there and throw a blank sheet in between this and the one which follows it, in order to prevent one sheet from offsetting onto the other. Then some developments were made in inks so they could be dried partially with the application of heat, and gas burners were put on the presses.

Then came along a few years ago the so-called anti-offset sprays. Moisture and vapor and spray were applied to wet print, which more or less provided a cushion between that and the next blank sheet being delivered on top of it, to prevent offset.

Q38. I think you also used the term "smudging". A. Smudging and slip-sheeting are the same thing.

Q39. I see. What have you to say with respect to the quality of the printing accomplished through heat-set inks, as compared with what is accomplished by the old linseed varnish inks? A. Well, I can only give you my (902) own personal observation on it.

Q40. That is all right. A. When we first considered the use of the heat-set inks, we were somewhat dubious as to whether or not we could get as good a quality of work, and even prior to the time we bought our equipment we went into the matter as thoroughly as we could and had tests made on the type of papers we intended running, and so forth, and we were very agreeably surprised that the results were as good as they were, and they were perfectly satisfactory to our customer, then the publisher of Esquire, that we had to satisfy.

I suppose, generally speaking, you could say that from a strictly quality standpoint the results are not quite equal. But they are so close that the average reader of a publication; or the average layman picking up any piece of printing, I do not believe he would be able to distinguish between the two.

Now, on the credit side of the ledger for heat-set inks. Some distinct advantages are that you are able to run more

ink on the sheet, get more "guts" in your work. Prior to the development of these heat-set inks, in certain types of paper it is always necessary to skin your ink down, carry it down, and your printing was grey, comparatively speaking, because of the fact you were always running into offset trouble.

(903) The tendency has been to run more ink on to get more "guts" in your printing, or contrast. So I would say that the results are very comparable as far as quality is concerned, all elements considered.

Q41. From what sources have you obtained your heat-set inks? A. You mean by that who our suppliers are?

Q42. Yes. A. Well, we have run inks from a number of different suppliers at different times; but our regular suppliers are International Printing Ink and Eagle Printing Ink.

Q43. The heat-set inks you obtained from International Printing Ink have been known as Vaporin inks? A. I believe that is their trade-name. That is how we refer to that type of ink.

Cross examination by Mr. Free:

Q45. Did you ever hear of heat-set inks prior to your use of them in 1938? A. I first became acquainted with them when they started publishing Life Magazine. I think it was the advent of Life in the publishing field that first aroused my personal interest and got us to thinking along those lines as far as our own production problems are concerned.

Q46. You had never heard of heat-set inks used in connection with shoe store work and book binding trade? A. No, I did not happen to be acquainted with them.

(904) Q47. Have you ever had any experience with rotogravure work? A. Yes, sir, some.

Q48. In that type of work, the usual rotogravure press has a doctor blade for wiping the surplus ink off the roll,

and then the ink is deposited on the web, and then hot air is blown on the web to dry the ink; isn't that so? A. Yes. It is an intaglio process where the ink is deposited in the wells of the cylinder, usually an etched copper cylinder, and the excess ink is scraped from the surface of the cylinder itself.

It has always been my understanding, however, that your rotogravure inks were highly volatile and dried principally by evaporation of the vehicle, or whatever carries the pigment or color.

Q49. How long ago was it that you saw a rotogravure press operate in the manner you just described? A. Well, I have seen rotogravure equipment running in various plants other than the one where I am employed, off and on over the years; I mean, when I have said "other plants", I suppose three or four times a year would be a fair average.

Q50. Do you understand it has not changed much over that period of time? A. My actual connection with a plant which operated rotogravure printing was just prior to the time I joined the Regensteiner Corporation, when I (905) worked for the W. F. Hall Printing Company of this city.

Q51. When was that? When did you leave Hall? A. Well, let's see. I have been down here seven years in February; it would make it 1935—it must be 1934.

Q52. Yes. And that rotogravure process we have been talking about has been in current use for, oh, say fifteen years anyway, hasn't it? A. Oh, I would think so, yes, at least. Now then, I think it has been longer than that. The firm I am now connected with was in the rotogravure business.

Q53. And, as I understand it, most of these rotogravure presses have a sort of a hood over them to draw those vapors that you described they give off, do they not? A. Yes, I believe they do, because the vapors are such that they are highly inflammable, and as a safety factor I think that they would take those fumes out against explosion and fires, and that sort of thing.

I do not set myself up as an expert on rotogravure. My only knowledge of it is general, as it is with a number of other processes in the printing business that I do not have a direct knowledge of.

Q54. Do you know anything about the composition of the heat-set inks you have been buying since 1938; do you know what is in them? A. Only in a general way. When I say that I know in a general way, it is really more (906) information that has been given to me by different people in the ink business than any specific knowledge that I personally have.

I am not a chemist; I have never taken any of it and analyzed it; but my understanding of the inks, generally speaking, is that the main difference between the heat-set inks and so-called regular linseed base inks is that the change has been made primarily in the vehicle.

In other words, different solvents which are dissipated by heat have been substituted to carry the pigments, which is color in the ink, rather than an oil base, as was usually the case in linseed varnish inks.

Q55. And in your plant on this one heat-set press you have described, do you also have a hood that carries its vapors off? A. Yes, we have an exhaust system in connection with the dryers which carry off vapors.

Q56. Can you describe the odor of those vapors? Did you ever notice how they smell? A. Well, I would say they smell about like any other burnt oil.

Q57. A kerosene odor, sort of? A. To a degree, yes.

Q58. Now as to the roller on your heat-set press; have you ever had any difficulty with the rollers cracking or swelling, the ink rollers? A. It would not be any more so than on any other type of press.

Q59. You have, I presume, synthetic rubber rollers on (907) that press? A. Well, we use a number of different types of rollers. We use a synthetic base roller; we also use both synthetic and we used with a non-melt base roller which is coated with a so-called composition.

Q60. That is a so-called composition coated roller? A. This is a composition coated rather than a composition all the way through. We have also used some canvas rollers.

Q61. Now about speeds. I would like to get a comparison. Would you say that the heat-set press output speed is about equal or equal to that of the rotogravure press? A. It is my understanding that there is some rotogravure equipment which runs at speeds in excess of any presses that I happen personally to know about that are running heat-set, although on some of the newer presses during the last year or two they have stepped the speed up considerably in the letter-press field, where we are using heat-set inks.

It has been more a question of—I believe, of being able to build presses that would stand up under the speeds than it has been able to dry the inks.

Q62. How about heat generated by friction and tack of the ink; that is a problem which increases with speed of the presses, isn't it? Don't your ink rollers sometimes get pretty hot? A. We have never noticed that our rollers got hot to the point where they caused us any (908) trouble because of these increased speeds.

Our particular press, we did have one press unit where we used to do some running of coated rollers, but it was more because of the construction of the press and its roller unit was adjacent to one of the dryers or heaters on the press and caused us some trouble during the hot weather.

Q63. How do you heat your web after impressing it with the heat-set ink? A. By an application of gas flame.

Q64. Is the gas flame pretty close to the web? A. Yes. The heater itself has ribbons from which the flame emerges and are approximately an inch and a half or two inches away from the web.

Q65. Have you any idea how hot that heater is, how much heat is applied to the paper? A. Well, in the neighborhood of 1350 degrees Fahrenheit.

Q66. So that if your web should stop with the heat on, it might burn? A. Well, it would very definitely burn unless there were devices in the heaters that would cool them. As I say, occasionally those things get out of order, of course, and you get a severed web as a result.

Q67. So the web is pretty hot when it leaves the heater, and that makes it necessary sometimes to cool the web, doesn't it? A. The web is then run over a cold water roller, yes, sir.

(909) Q68. But for that the ink would be sticky? A. No, we have not found that to be the case. My own observation has been that the ink is just about as well set on the web after it leaves the heater itself as it is after it goes over that cold water roller; but the cold water rolls had put a certain amount of humidity back in the paper and makes us less trouble and makes your web less apt to break.

I do know that there are other inks being developed that they are setting by running them over cold water rollers, running under heated rolls.

Q69. The reason I asked the question was, I understood from another printer that the resins that are used in these inks are also softened by the heat, and that even after the solvent is driven off you have to cool down the remaining resin in the ink so that it will in turn harden. Does that sound reasonable to you? A. Well, I think possibly it has to be a combination of both to successfully dry it. I may have been—I may not have been absolutely correct in my first answer there because, when I think of it, I do know that we do get a slow accumulation of ink at times on the water drums, and we have to wash them off; so evidently the ink does not set to the same degree of hardness when it hits them as it leaves them.

(910) Q70. Have you any idea how cold those water drums are? Is it city water, or is it refrigerated? A. No, we use the regular city water from the city mains. It passes through this so-called—the cold water rollers, which are nothing but a hollow steel drum.

Q71. City water is around 40 degrees, 45 or 50; it depends upon the time of year? A. I don't know. I do know that we do not refrigerate it in any way before we run it through the presses.

Q72. Anyway, it is cold enough so that when the paper comes off those rollers, it is about room temperature, isn't it? A. No; I would say that the paper is slightly warmer when it is being delivered than it is at the time it is being fed into the press. Just how much, I am not able to answer that.

Mr. Free: I also want to object to this entire Joy deposition, on the ground that it has not been connected up with the ink of the patent in suit. He said he did not know anything about it, and it is largely directed to a process which is excluded by the patent in suit.

Mr. Watson: Is that overruled, your Honor?

The Court: Objection overruled. Are you sure it should be overruled.

Mr. Watson: Yes. I think I made an objection (911) to these metal progress magazines going in that he offered, and you overruled my objection, so the same applies to his.

We could finish up in ten minutes, your Honor, I think, by reading the balance of this Dennerlein deposition.

The Court: All right.

Extracts read in evidence from deposition of PETER DENNERLEIN, Manufacturing Director of Crowell-Collier Publishing Company (Extracts from this deposition previously read in evidence are printed at Record, pp. 235-238, 501-510).

Direct examination by Mr. Watson:

Q. What kind of presses do you use in the printing of the magazines at this time, Mr. Dennerlein? A. Well, we

use practically every type of letter-press equipment which is being used at the present time on publication work, and also a rotogravure high speed press.

Q. Letter press printing, as I understand it, is printing in which the characters are raised above the surface of your impression cylinder? A. That is correct.

(912) Q. Whereas gravure or rotogravure uses an impression cylinder in which the characters are below the printing surface? A. That is right.

Mr. Watson: Now on page 5, talking about the Vaporin or heat-set type inks, at line 21—that is the second question from the bottom of the page:

Q. Have they any particular advantages over the oil or varnish type ink? A. Oh, by all means, many advantages.

Q. What would you say they were? A. First of all of course they are conducive to a much higher quality of printing. Second, much higher speed. It is because of the introduction of the Vaporin or heat flash inks that the letter press field has been more or less revolutionized: They have enabled us to print black and black and one color both sides of the sheet three times faster than ever before, and also enabled us to print four colors on both sides of the sheet at one time or at the same time.

Q. And that is done on a perfecting press? A. A web perfecting press.

Q. I presume the word "web" there means a perfecting press which prints on a web of paper? A. Not necessarily, but it means you are starting with a roll of paper which goes through the press and it is cut into sheets, or folded, (913) and cut into sheets.

Q. That is at the delivery end of the press? A. At the delivery end; yes.

Q. Fed through the printing apparatus as a continuous roll of paper? A. As a continuous roll or ribbon of paper

Q. Is the typographic ink different in consistency from the gravure ink? You spoke of gravure ink as a thin liquid. A. Yes; the typographic ink is more or less a paste, and the reason for needing it in paste form is that the ink is being laid on top of or deposited on top of raised letters and raised half tone dots which are approximately two and a half or three thousandths of an inch higher than the surface of the plate, and if the ink was the same consistency as the gravure ink, why, it would simply flow off the dots and off the letters. Therefore it has to be a paste so it will stay on top of these raised surfaces.

Q. I have been told that it is somewhat of a trick—not a trick, but you have to be particularly careful about getting the proper amount of ink on the raised characters in letter press printing; is that correct? A. Well, that is true. Of course if you do not get enough ink on there, why, your impression is unsatisfactory—the print is not dark enough or legible, and if you get too much it (914) simply settles around the half tone dots and fills in between the letters.

Q. To control that they use a rather complicated series of rollers, do they not? A. Yes.

Q. How is the ink fed to the impression plate? A. Well, you first start from a trough of ink and you have a series of rollers which carry the ink to and finally deposit it on the printing plate, whereas in gravure the ink is sprayed against the cylinder and the ink is so liquid and thin that it settles into the various depressions, and the excess is wiped off the surface of the cylinder by what is known as a doctor blade, or a very thin steel knife. This knife simply scrapes the excess ink off the surface of the cylinder.

Q. You said that the inks used on the gravure type of press contains a volatile solvent: that is, a solvent which is more volatile than the solvent used in the typographic inks. A. There is a more volatile solvent in gravure ink because it requires no varnish at all and it is not exposed to air and doesn't go over a series of rollers.

(915) Q. I see. A. Therefore it is not exposed to the air at all and for that reason we can use a more highly volatile solvent in it.

Q. Is that prevention of exposure to the air accomplished through the device which has been known as the Weiss closed fountain? A. Yes. The closed fountain prevents the ink in the fountain from being exposed to the draught of the room. It is an entirely enclosed fountain. The enclosure fits right around the printing cylinder and ink in the trough or fountain underneath is kept flowing by a pump which takes the ink out of the fountain and brings it back and sprays it against the cylinder. It keeps on rotating all the time.

Q. You don't have the ink exposed to the atmosphere? A. Oh, no; it is sprayed inside of the fountain.

Q. As I understand it, the Weiss closed fountain permits the use of a much more volatile solvent than could be used before, when ink in the fountain was exposed to the atmosphere; is that right? A. That is right; yes.

Q. Is that Weiss closed fountain a recent development? A. I can't give you the exact time, but I would say about 10 or 12 years old. That is approximately right. I think it was about 1932 or previous—1930, or even 1928. Our first presses started here in 1935.

Q. It permitted the use of a faster drying gravure ink;
(916) is that right? A. Yes. We are able to run three times as fast. We can now run at a speed of 1200 feet a minute, which is pretty fast.

Q. How in your opinion does the advent of the heat flash inks for letter press printing compare with the introduction of the Weiss closed fountain for gravure printing or rotogravure printing? A. I didn't quite follow you on that. How does the vapor or heat flash type inks compare with the oil type?

Q. No. How does the effect of the introduction of "Vaporin" or heat flash ink for letter press printing compare with the introduction of the Weiss closed fountain

for rotogravure printing? A. I would say they have both done a similar job inasmuch as they allowed us or enabled us to run about three times as fast as we did before.

Q. In their respective fields? A. In their respective fields for printing; yes.

Q. Would it be possible to use a closed type fountain for letter press printing? A. Well, there is no use having a closed type fountain without inclosing also your printing ink rollers which carry the ink to the impression cylinder. That is where it is exposed to the air in drying.

Q. So closing the fountain would do no good in letter (917) press work? A. Would do no good in letter press without inclosing the rollers as well as your printing cylinder.

Q. You mentioned the paraffin wax spray, Mr. Dennerlein. I think it would be helpful to describe it to us, what it was and what it was supposed to do and what it accomplished: Let me say it is my understanding that it was used with the so-called old varnish type inks. A. That is correct.

Q. That is right? A. Yes. The old varnish type ink of course had the unfortunate fault of offsetting particularly in four colors, and for that reason we used this blotting paper in between each printed sheet. The paraffin wax is the common ordinary paraffin, melting at about 120 or 130 degrees. In the winter time we used around 120° and in the summer, 130 to 140° melting point, and we would stick that in a pot which was electrically heated and it would flow or come into a trough. In this trough were revolving wheels. Those wheels as they came around got in contact with a little nozzle. That nozzle would spray a mist of wax on top of each printed sheet. (918) This immediately eliminated the blotting paper. Those little particles of paraffin which dry of course as soon as they hit the sheet, would raise the surface just enough to allow that ink to more or less act as being dry. Of course, the ink was not dry. The paraffin simply acted as a sort of an

inlay to prevent that ink from smearing or offsetting on the succeeding sheet. In fact, we still have some of those.

Q. Was such a spray used with a web press—you say it was sprayed on the sheets? A. Yes.

Q. Does that mean sprayed on the sheets as they left the press? A. Yes.

Q. For instance you could not use it after the first side printing in a web perfecting press? A. No.

Q. Just on a sheet delivery press? A. Yes.

Q. As the sheets were delivered? A. And on one side only.

Q. On one side only? A. Yes.

Q. You would not use it on the second side? A. Not on the second side, no; you need spraying on only one side of the sheet, but you would use it every time you ran the sheet through the press.

Q. Would that permit you to increase the speed of the presses? A. Yes.

Q. Could you tell us how much? A. Yes, I would (918-A) say about 25%.

Q. About 25%? Yes.

Mr. Watson: The balance of this disposition, your Honor, was previously read.

Mr. Free: I make the same objection as to that, your Honor; no connection between the Dennerlein deposition and the ink of the patent in suit, and it involves a process excluded by the patent in suit.

The Court: The same ruling.

---

(919) Mr. Byerly: I will call Mr. Bragdon.

Charles R. Bragdon, for Plaintiff—Direct.

CHARLES R. BRAGDON, recalled as a witness on behalf of the plaintiff, in rebuttal, having been previously sworn, testified further as follows:

Direct examination by Mr. Byerly:

Q. Mr. Bragdon, has your laboratory examined the so-called "Flash-Dri" inks of the Frederick H. Levey Company? A. Yes, we have.

Mr. Free: How is this material? Levey is not in suit here.

Mr. Byerly: Your Honor, I understand that yesterday afternoon there was an objection to some of our depositions regarding the use of these inks because the composition of the inks referred to by the witnesses who used them on presses had not been proved, and Mr. Watson stated that that would be connected up.

Mr. Free: This is a Levey Company. I think we ought to connect the Levey Company up with the plaintiff or with the defendant in some way before we go on to that company.

Mr. Byerly: It is merely for the purpose, your Honor, of showing that the inks to which this witness referred and which they said successfully dried, to show what the composition of these is.

(920) The Court: Were those inks put in here as exhibits?

Mr. Free: They are not even the plaintiff's inks, as I understand it. They are somebody else's.

The Court: Whose inks are they?

Mr. Byerly: These inks are made by the Levey Company, and several of the witnesses whose depositions were read were asked about these inks, I think, by Mr. Free, and they said that they worked satisfactorily. Now if they are totally different from the plaintiff's inks that would seem to indicate

that any kind of an ink will work. If they are identical in composition that shows that an ink of this sort of composition is required to do this, so it seems to me they directly bear on these depositions that were placed in evidence.

The Court: I will overrule the objection.

Mr. Byerly: Will you read the question?

Q. (Read.)

Q. What did you find as to these inks? A. We made complete analysis of them and found that the solvent is a petroleum hydrocarbon of the character similar to that used in the plaintiff's inks. It is about between butyl carbitol and the 502-C in its boiling range and in its vapor pressure.

Q. Did you find whether there was a resin dissolved in (921) this solvent? A. They contained resins dissolved in this solvent.

Q. There was reference in the depositions to inks supplied by the General Printing Ink Company. Has your laboratory examined those inks?

Mr. Free: Again, your Honor, we have to connect the defendant or the plaintiff with these inks we are talking about with the patent in suit.

The Court: What is the question?

Q. (Read.)

The Court: I do not think that is material. You cannot go into the whole market of all the inks and have him testify about that, unless the parties who make those inks have had something to do with this lawsuit or the issues connected therewithin.

Mr. Byerly: This is for the same purpose, your Honor, because they were brought up in cross examination of the witnesses as to the use of the inks, and we wish to show that the inks which they said could be used successfully were not something en-

tirely different but were substantially identical with the plaintiff's inks.

Mr. Free: Then it is immaterial. Let us talk about plaintiff's inks because this is rebuttal, and if Mr. Byerly wants to or can prove that plaintiff's inks (922) have anything to do with the patent in suit, that he may do; but not with Levey's inks or General's inks, which show no connection to the plaintiff or the defendant here, and that is what I am objecting to.

The Court: I will sustain your objection.

Mr. Byerly: Your Honor, I should like to note on the record under the rules that the plaintiff offers to prove that——

The Court: Write out what you offer to prove and put it in the record.

Mr. Free: May we have this Levey testimony stricken on the same point?

The Court: No, there is more direct reference to the Levey than there was to this, as I recall the depositions.

Q. Mr. Bragdon, you are familiar with the expressions "distillation range" and "boiling range"? A. Yes, I am.

Q. What is the difference between them? A. Well, they are used interchangeably so far as I have ever known in reference to solvents.

Q. You referred and Mr. Taylor referred to the A. S. T. M. method of determining boiling ranges and distillation ranges, did you not? A. I did.

Q. Can you produce a publication of the A. S. T. M. describing this method? A. I have the A. S. T. M. 1942 (923) Book of Standards which gives a description of the distillation test for naphthas, kerosenes and similar materials.

Q. Is this the book to which you refer (handing to witness)? A. That is it. The method of test is referred to as method D86-40.

Q. What page of the book is that method described on? A. It is on pages 862 and 863. It begins on page 859.

Q. Does the description of the method make any reference to determining the end point of the distillation? A. It does.

Q. Will you read what it says about that? A. On page 863, the first paragraph in the second column, it says:

> "The end point is the maximum temperature observed on the distillation thermometer and is usually reached after the bottom of the flask has become dry."
>
> The Court: Is that when it evaporates out?
>
> The Witness: Yes, your Honor. Everything except what is present in the form of vapor in the distillation flask, which usually is condensed again after the heat is taken off.

Q. I call your attention to Defendant's Exhibit B-1 which, as I understand it, indicates some distillation (924) ranges or boiling ranges which Mr. Taylor purported to have determined by the A. S. T. M. method. Do you find any note of the end points of those boiling ranges? A. The end points are not shown on this chart. The highest figure shown is at 95 per cent in each case—95 c.c. on a total of 100 c.c.

Q. Among the other lines on that chart, Defendant's Exhibit B-1, do you find one which purports to relate to Defendant's solvent 502-C? A. I do.

Q. I now show you Defendant's Exhibit LL which purports to show, under the heading "Sample H" a distillation range determined by the A. S. T. M. method of this same solvent 502-C made by Mr. Krawetz of the Phoenix Chemical Laboratory, Inc. Have you compared the boiling range given in Defendant's Exhibit LL with that given by Mr. Taylor on Defendant's Exhibit B-1? A. I have, and I find that there are a number of differences.

Q. Have you yourself determined the boiling range of defendant's 502-C using the sample furnished by defendant's counsel? A. I have. I find that the boiling range which we got by the A. S. T. M. method is very close to that given by Mr. Krawetz but is quite different from that shown by Mr. Taylor.

Q. Have you prepared a chart showing the difference (925) between the determinations made by you and the defendant's witness, Mr. Krawetz, and that made by Mr. Taylor? A. I have.

Q. Is that it (handing to witness)? A. It is this chart here.

Mr. Byerly: I offer in evidence the chart made by the witness as Plaintiff's Exhibit 45.

Mr. Free: You haven't said how you made it yet. I object to it until we know.

Mr. Byerly: Well, I will mark it for identification so that we can refer to it.

(Marked Plaintiff's Exhibit 45 for identification.)

Q. Just tell us what this Plaintiff's Exhibit 45 for identification is. A. Plaintiff's Exhibit 45 for identification shows in the upper line drawn in red the same curve as is shown on Taylor's Exhibit B-1—Defendant's Exhibit B-1. The two lines just below that are the boiling ranges as determined in our laboratories, and the line drawn through the points shown by Mr. Krawetz on Exhibit LL.

This is drawn on the same scale as the defendant's chart, and by placing the one over the other you can see that the Taylor curve corresponds with the one shown on his chart. The other curves lie below that, indicating——

The Court: The vapor curve?

(926) The Witness: That is the boiling range curve. That shows the progressive increase of temperature as the sample is distilled from a boiling

flask into a condenser. The initial boiling point which we obtained was about 260 degrees as compared with Krawetz's 263. Mr. Taylor did not show the initial boiling point. At 5 per cent distilled all three curves are about the same, but from that point on Mr. Taylor's boiling point seems to rise rapidly, whereas the boiling points determined by Krawetz and in our laboratories are almost a horizontal line, or much nearer a horizontal line than shown by Mr. Taylor. The end point which we get is much lower than the end point shown by Mr. Taylor, or, that is, the 95 per cent point shown by Mr. Taylor.

Q. Then, if I understand it, Mr. Krawetz's determination which you have checked shows that the defendant's solvent has what we call a narrower boiling range than the determination given by Mr. Taylor? A. That is correct.

Mr. Byerly: I now offer in evidence the exhibit previously marked 45 for identification.

(Plaintiff's Exhibit 45 for identification received in evidence.)

Q. Did you check any other of the boiling range determinations given on Taylor's Exhibit B-1? A. I did, (927) one of those that we compared was the boiling range given for the I. P. I. petroleum solvent. We have not similar differences there.

The Court: How many degrees is he off?

The Witness: I think at one part of the curve he is about 10 degrees off.

Q. Have you prepared a graph indicating your determination of the boiling point of the I. P. I. solvent, a sample of which was given to the defendant, and Mr. Taylor's examination contained on Exhibit B-1?

Mr. Free: At this time it may be appropriate, your Honor, to ask whether the solvent he mentioned was the same solvent that Mr. Byerly gave him.

The Witness: It is. It was taken from the same can. The curve on this chart drawn in red is identical with the curve shown by the defendant.

The Court: That is, Taylor's curve?

The Witness: Taylor's curve. You place that over that curve. That shows Taylor's determination and this shows the determination in our laboratory, which shows a much nearer horizontal line than Mr. Taylor's.

The Court: Which do you think is correct?

The Witness: I think our determination is correct.

(928) The Court: You used the same methods?

The Witness: We used the same method.

The Court: Which of you is the most experienced in doing that?

Mr. Free: I think those are within the range of experimental error. Those things are never very accurate, right on the nose, of course. I think you can take your choice. They are both so close it does not make any difference to me.

Mr. Byerly: I would like to point out to your Honor that the chemist for the company who sold this oil and Mr. Bragdon have reached substantially the same results, and Mr. Taylor's is quite at variance, and we think they are wrong.

The Court: The chemist who sold it naturally would be an interested party. Anyway, he is not in court and he has not been examined.

Mr. Byerly: Yes, he gave a deposition, which has been placed in evidence.

The Court: What is his name?

Mr. Byerly: Krawetz. I now offer in evidence the chart referred to by the witness and ask that it be marked.

(Marked Plaintiff's Exhibit 46.)

(929) Q. Did you find any other curves that you checked on Mr. Taylor's Exhibit B-1 that were erroneous?

Mr. Free: Just a moment, I did not notice this Exhibit 46. This refers to an I. P. I. solvent and not ours, and Mr. Krawetz was the chemist who furnished our solvent. So the statement that has to do with Exhibit 46 I do not think is accurate, Mr. Byerly.

Mr. Byerly: I would like to make it entirely clear, that we find that the Krawetz determination put in by the defendant on the defendant's solvent was widely different from that of Mr. Taylor's. We checked that and found that Mr. Taylor was wrong on that, and then we checked some of his other lines. I think your Honor will find that one of the defendant's chemists agrees with Mr. Bragdon and the other does not, and that will be a matter for your Honor to determine.

The Court: What difference does it make?

Mr. Free: None whatever. The real issue is whether or not either of these solvents is anything like butyl carbitol, and the answer is no. The curves tell that.

Mr. Byerly: The reason for putting this curve in is this, that the butyl carbitol curve, as you can see from this Exhibit B-1, is almost a horizontal line, and these determinations made by Mr. Bragdon (930) are much more like that than these wiggly curves made by Mr. Taylor.

The Witness: You asked a question?

Q. (Read.) A. The curve that he shows for butyl carbitol acetate differs considerably from the curve that we obtained on a portion of the same sample that was given to Mr. Free. I have drawn a graph to show the comparison between our curve on that and the defendant's curve.

Q. Is this the chart to which you refer? A. It is. This can similarly be placed over the defendant's chart, showing the same comparison with his distillation range, and this dark line represents our determination, which you see is almost——

The Court: Of what material?

The Witness: Butyl carbitol acetate. It is another Carbide & Carbon Chemical's product related to butyl carbitol and this curve corresponds much more closely to the distillation ranges which are given by the Carbide & Carbon Chemicals Company.

Q. By this curve you mean the one that you determined? A. The one that I determined, yes.

Mr. Byerly: I now offer in evidence the chart just produced by the witness and ask that it be marked.

(Marked Plaintiff's Exhibit 47.)

Mr. Free: I would like to note on the record (931) that all this is immaterial anyway, because the patent does not mention anything about boiling ranges or distillation ranges. The question is vapor pressures, so this is immaterial.

Mr. Byerly: If the defendant wishes to withdraw Exhibit B-I, of course, it becomes immaterial.

Mr. Free: We did that because the distillation range was brought in by the plaintiff in its prima facie case.

The Court: I will admit it.

Charles R. Bragdon, for Plaintiff—Direct.

Q. Mr. Bragdon, there is on this Exhibit B-1 a curve marked "Kerosene 250° C. plus"——

The Court: Whose exhibit is that?

Mr. Byerly: Defendant's Exhibit B-1.

Q. —did you check Mr. Taylor's determination of this substance? A. We did not, the sample——

The Court: If you did not check it, why, that ends it. That is all he asked you, was whether you checked it. You say you did not?

The Witness: We did not have an opportunity to determine it.

The Court: I do not care anything about that. He asked you if you checked it and you said no. You answered it before.

Q. Did you receive from defendant a sample of this (932) kerosene fraction referred to in that curve? A. We did receive a sample, but it was only about an ounce of material, which was not enough to make the distillation test.

Q. How long have you been familiar with petroleum products, Mr. Bragdon? A. Since 1909 I have been running tests on various petroleum products.

Q. And that includes these A. S. T. M. boiling range tests? A. It does.

Q. Has there been any change in kerosene between 1922, when the Doughty patent was issued, and the present time?

Mr. Free: Do you know that? I think we have been all through this. He has got to show he has had experience in the petroleum industry to tell that, and he has not been qualified as to that.

Mr. Byerly: He said he has been determining these ranges for a great many years.

The Court: You can ask him some cross examination on that.

A. I have made a number of distillation tests on kerosene at various times, and I would say that there has been a change in kerosene since 1922.

The Court: In the composition of it, you mean?

The Witness: Not so much in the composition, your (933) Honor, as in the wideness of the boiling range.

The Court: Is kerosene different today from what it was in 1932?

The Witness: It is.

Q. What is the nature of the difference? A. The boiling range was much wider in 1922 than it is today.

The Court: Who makes kerosene, these big petroleum companies when they make gasoline?

The Witness: Practically every petroleum refiner in the country makes kerosene.

Q. I show you two pages from a book entitled "Petroleum", published in 1922, which was shown to the defendant's witness, Mr. Taylor, and ask you whether you can determine from what is stated in this book as regards typical sample of American kerosene, how that boiling range there referred to compares with the present-day kerosene? A. The typical American kerosene is shown here as having a percentage below 150 degrees Centigrade of 14.4, 150 to 270 degrees Centigrade 45.9, residue 39.7, which would indicate that that is the proportion of the kerosene boiling above 270 degrees, which is much higher than is the case of the American kerosenes now.

Mr. Byerly: I will offer in evidence this photostat of the pages of the book entitled "Petroleum" (934) shown to the witness.

(Marked Plaintiff's Exhibit 48.)

Q. Have you made up a kerosone comparable to some of those used in 1922, for instance the one mentioned in the book which I have shown you? A. I have.

Q. How did you make this? A. I made it by taking some of the present-day kerosene and adding higher boiling fractions of the same general character, so as to bring the end point up to about the limit shown by the government specifications in 1922.

Q. I call your attention to Plaintiff's Exhibits 34 and 35, containing the government specifications for kerosene. What is the end point permitted by those specifications? A. The end point given in the 1920 specification, Exhibit 34, for prime white kerosene is 625 degrees Fahrenheit. That means the final boiling point when the flask becomes dry is 625 degrees Fahrenheit. 625 degrees Fahrenheit is 330 degrees Centigrade. In this Exhibit No. 35 the statement is given, "7. Distillation. The end point shall not be higher than 625 degrees Fahrenheit." That is under "Kerosene".

Q. And that you say is equal to 330 degrees Centrigrade? A. It is.

Q. Did you determine the boiling or distillation range of the 1922 kerosene which you made up by the A. S. T. M. (935) method? A. I did.

Q. Does this paper I show you contain that boiling range? A. That is it.

Mr. Free: I want to object to this. This is immaterial. He is making up kerosene. He is not taking ordinary commercial kerosene. We do not know what he put in it, and what he gets when he gets through.

The Court: The objection is sustained.

Mr. Byerly: If your Honor pleases, it seems to me this is proper rebuttal to defendant's testimony, which purported to interpet the Doughty patent and misinterpreted it by taking a present-day kerosene rather than the type of kerosene available at the time the patent was issued, and it seems to me that

we have a right to show the difference and to point out what difference it would make in the exhibits which the defendant has put in, if they had used the 1922 kerosene instead.

The Court: He has already testified as to what his tests with the 1920 kerosene were.

Mr. Byerly: He is in the middle of that testimony now. He has produced the boiling range, and I am going to get him——

Mr. Free: This is the made up kerosene. I want to make that clear. This is not kerosene that is (936) gotten on the market. He took kerosene that he got on the market and added something to it. We do not know what it was, and it is not what the defendant did. I want to get that straight, too.

The Court: He has got to take the kind of kerosene required in the book there.

Mr. Free: That is right, and this is not it.

Mr. Byerly: I think all this argument is out of place. Mr. Free can cross examine on what the witness has done.

Mr. Free: This is immaterial.

The Court: I think it is immaterial.

Mr. Byerly: Your Honor will not let us pursue this?

The Court: What kind of kerosene are you referring to?

The Witness: I took a present-day kerosene and added to it higher boiling portions of the same type of petroleum as is used in making kerosene.

The Court: Made by whom? Kerosene made by whom?

The Witness: The bulk of the kerosene that I used was Socony Vacuum's product, and to that I added a fraction, a high boiling fraction made by the same company that makes the defendant's 502-C oil, and to make a smoother boiling range I also

added a portion of the same type of (937) petroleum product from the Atlantic Refining Company, which had a boiling range intermediate between the two.

The Court: You had an entirely different product then?

Mr. Free: If it was not kerosene we do not know what it was.

The Court: We do not know whether it was kerosene or not.

Mr. Byerly: If your Honor pleases, the situation is very simple. In 1922 there was much less demand for this heavy fuel oil than there is now, and consequently they took more material which they now sell as fuel oil and kept it in the kerosene; that is, they made a wider cut.

The Court: Who has testified to that here?

Mr. Free: No one, your Honor. This is counsel testifying. The Doughty patent is very specific. He says, "I do not want a solvent which boils higher than 300, and I take kerosene and I cut it off at 250." There he says definitely you have a cut of 50 degrees from 250 to 300. We showed by the Mellon Institute book that we used the same as 1922 ordinary American kerosene, in that it fitted those specifications. That is all we were called upon to do. And then Mr. Taylor bought some kerosene, ordinary kerosene, still like Doughty used, (938) and that turned out to be much the same thing. We did not fix up any kerosene. We bought it on the market, and it happened to have been the same as it was in 1922. This stuff he is talking about, it has gasoline in it. Heaven knows what is in it.

The Court: That is just something he made up.

Mr. Byerly: He made it up on the basis of these publications and government reports to be like the kerosene made in 1922, and we want your Honor to get a correct view of this patent. If you permit the

kerosene made today, which is different from that which the inventor had in mind——

The Court: He can take kerosene made in 1922 if he wants to, but he made up a concoction of his own; which we do not know what it was.

Mr. Byerly: He has explained what it was, and he cannot get 1922 kerosene unless he happens to have saved some, which is quite unlikely.

The Court: Has he got any formula, or can he get someone who made kerosene in 1922 and knows what it was, and compare it with this stuff he made up? Then we can have a basis to know whether he is correct or not.

Mr. Byerly: We can do that, but he has told how he has made it. He has produced his determination of the boiling range. The boiling range fits with what was stated (939) in the book which we showed your Honor, describing the typical 1922 kerosene. It also fits the government specifications. Now that is pretty definite proof.

The Court: The objection is sustained.

Q. Did you determine the vapor pressure of this kerosene to which you have referred as 1922 kerosene? A. I did.

Q. And you produce a chart showing the vapor pressure of this kerosene during evaporation at 150 degrees?

Mr. Free: This is the same line of questioning. This is not 1922 kerosene he is talking about.

The Court: We do not know whether this was 1922 kerosene or not that he is referring to here. It is just something that he made up out of his own mind for his own particular pleasure. I think this question comes within the ruling of the Court and will not be admitted. Do you know what 1922 kerosene was?

The Witness: I have distilled a number of samples of kerosene in 1922.

The Court: Is this concoction the 1922 kerosene?

The Court: It was of that general character.

The Court: Not specifically the same?

The Witness: Not specifically the same.

The Court: Then the objection will be sustained.

Mr. Byerly: I should like, under the rules, to (940) make an offer of proof of the boiling ranges and the vapor pressure of the kerosene about which the witness has testified, and I include in this offer of proof the witness's determination of the boiling range and the vapor pressure, and ask to have them marked for the purpose of identification.

The Court: Very well, as part of the offer of proof.

Offer of proof by Plaintiff.

(Marked Plaintiff's Exhibits 49 and 50 for identification.)

Mr. Byerly: As part of the offer of proof I offer chart showing the boiling range of the kerosene above 250 made by the witness, and the kerosene above 250 given by Mr. Taylor on Exhibit B-1 and ask that this exhibit be marked for identification.

(Marked Plaintiff's Exhibit 51 for identification:)

Mr. Byerly: I also include in this offer of proof by this witness that after he had made this kerosene, which he says is made in accordance with the specifications for 1922, he distilled this kerosene at 250 degrees Centigrade, in precisely the same way Mr. Taylor stated that he distilled the Pure Oil kerosene to obtain a fraction over 250 degrees, and that the boiling range and vapor pressure determination of Exhibits 50 and 51 for identification were made from the residue remaining after (941) distillation at 250 degrees.

The Court: Have you finished your offer of proof?

Mr. Byerly: Yes, your Honor.

By Mr. Byerly:

Q. I now call your attention to Defendant's Exhibit I-1. Defendant's Exhibit I-1 purports to give the vapor pressure of terpineol, does it not? A. It does.

Q. Have you checked this with Defendant's Exhibit J, the Brewer and Gardner article? A. Yes, I have.

Q. Do you find that Mr. Taylor's determination of the vapor pressure of terpineol at ordinary temperatures is the same as Brewer and Gardner? A. No, it differs from Brewer and Gardner's. Brewer and Gardner show for terpineol a higher vapor pressure at 20 degrees, about 6/100ths of a millimeter, whereas Taylor's curve is 4/100ths.

Q. I call your attention to a line on this chart marked "Kerosene fraction 270 plus". Could such a fraction have been obtained from the kind of kerosene which Mr. Taylor said he used? A. The fraction would have been only a trace of material. There was very slight residue left in the distillation flask, because the end point of the defendant's kerosene was 270 degrees Centigrade.

Q. Did you determine the distillation range of defendant's kerosene from the sample of the kerosene (942) received from the defendant; that is, before Mr. Taylor fractionated it? A. I did.

Q. Is this your determination of the boiling range of defendant's kerosene? A. That is it.

Mr. Byerly: I will offer that in evidence.

Mr. Free: May I ask which kerosene that was, Mr. Byerly?

Mr. Byerly: That was the sample you gave us in Cincinnati, which he afterwards fractionated. This is the sample of kerosene which he drew out of a tank somewhere and said he was going to use.

(Marked Plaintiff's Exhibit 52.)

The Court: We will take a ten-minute recess.

(Short recess.)

Q. Mr. Bragdon, have you compared the formulae contained on the formula cards, Defendant's Exhibits F-2, G-2, H-2, I-2, J-2, produced by Mr. Carroll, with the formula given in the McElroy patent at page 2, lines 16 to 27? A. I have.

Q. Have you written out a comparison showing the percentages of the ingredients in the ink vehicle, both in the Doughty patent and in the formulas produced by Mr. Carroll? A. Yes. The formulas show several differences. In the McElroy patent they have 79.8 of terpineol, 4.2 of rosin-oil and 16 of powdered Cumar to make up 100 parts. (943) The Carroll formula used in the red, yellow and black inks are 14.3 of terpineol, 28.6 of pale second run rosin-oil and 57.1 of Cumar P-25, which is entirely different from powdered Cumar. Cumar P-25 is a viscous liquid.

The Court: May I see that?

(Witness hands paper to Court.)

The Court: What is the Carroll formula?

The Witness: That is the formula shown on the defendant's exhibits figured in percentages of 100 parts.

The Court: This is for varnishes, isn't it? There is no coloring matter?

The Witness: That is correct. The coloring matter is afterward added, and in the blue there was additional rosin-oil and terpineol added so that it makes the proportions slightly different as shown at the bottom of the sheet (indicating).

Q. Now I show you the Cumar specification chart, which is marked for identification as Plaintiff's Exhibit 38, and

which is part of a catalog of the Barrett Company. Are you familiar with the Cumar resin manufactured by the Barrett Company? A. I am.

Q. Do you recognize this pamphlet containing this chart marked for identification as Plaintiff's Exhibit 38? A. I do.

(944) Q. Does it state the physical properties? A. Yes.

Q. Of these Cumar resins? A. It does.

Q. What does it say as to the Cumar P-25 referred to on Defendant's Exhibit F-2? A. It describes it as viscous.

Q. Could that resin be placed in the form of a powder as is specified in the Doughty patent? A. Not unless you would take it down considerably lower in temperature, to freeze it and then powder it.

Q. Are there any of the Cumar resins which could easily be placed in the powder specified by Doughty? A. Yes, a considerable number of them.

Q. Will you mention some of them? A. The W grade which is furnished in several different types: the V grade, the MH grade, the RH grade, the MS, the RS, SX, DX, EX and FX.

Q. Those grades to which you have referred are hard substances which can be powdered? A. That is right.

Q. Does this catalog specify the purpose for which the P grade referred to on Defendant's Exhibit F-2 is intended? A. The P grades which are described as plastic, low-melting resins, are said to have as uses adhesives, rubber, plastic compounds, waterproofing.

Mr. Byerly: I now offer in evidence a (945) comparison of formulas produced by the witness.

Mr. Free: I would like to note on the record that this comparison is merely for vehicles and not an ink. It is immaterial.

The Court: Objection overruled.

(Marked Plaintiff's Exhibit 53.)

Mr. Byerly: I offer in evidence the Barrett Company's catalog referred to by the witness and containing the chart previously marked Plaintiff's Exhibit 38 for identification.

The Clerk: Page 12 was marked 38 for identification. Is this the entire catalog you are offering?

Mr. Byerly: I think the entire catalog had better have a new number so as not to be confused with the testimony of the witness.

(Marked Plaintiff's Exhibit 54.)

Q. You said that Cumar resin P-25 could be powdered if it was frozen. Would it stay in powdered form when it was warmed up to room temperature after being frozen? A. It would resume its viscous liquid condition.

Q. You referred to the difference in the boiling ranges which you determined of certain of the solvents mentioned on Defendant's Exhibit B-1 and your own determinations. Have you prepared a chart showing your (946) own determinations of defendant's 502-C ink oil, the L.P.I. petroleum solvent mentioned on Defendant's Exhibit B-1, and butyl carbitol acetate? A. I have.

Q. This chart also contains a line referring to the fraction of your 1922 kerosene as to which evidence was excluded, does it not? A. It does.

Mr. Byerly: I offer in evidence the chart referred to by the witness with the exception of the line relating to kerosene, 250 degrees C. plus, and I should like to make an offer of proof to include that line.

(Marked Plaintiff's Exhibit 55.)

Q. I call your attention to Defendant's Exhibit Q purporting to relate to vapor pressure of certain solvents mentioned in the Lefferts and Stevens patent. The lines on this chart are marked nitro-benzole, oil of pennyroyal, oil of fennelseed, oil of sassafras, oil of cinnamon, oil of cassia

and oil of cloves. Are those substances aromatic compounds or open chain compounds? A. They are all aromatic compounds.

Q. Are they saturated compounds or unsaturated compounds? A. They are unsaturated except nitro-benzole.

Q. These various oils referred to, including oil of cassia, is there any general name for that character of substances? A. They are called essential oils. They are (947) derived from plants and they are mixtures of chemicals.

Q. What are they used for ordinarily? A. They are used for flavoring and perfumery generally.

Q. Did you some time ago determine the vapor pressure of oil of cassia? A. We did.

Q. From whom did you purchase this oil of cassia? A. We purchased it from Schimmel & Company in 1938.

Q. Tell me what the papers are that I now show you (handing to witness)? A. This is a voucher and an invoice for five pounds of oil of cassia rectified U.S.P. 11.

Q. Is that the oil of cassia on which you determined the vapor pressure? A. It is.

Q. And that was done in 1938 at the time of the invoice? A. Yes, sir.

Q. Did you find the vapor pressure of this oil of cassia the same as the vapor pressure given for oil of cassia on Mr. Taylor's chart, Defendant's Exhibit Q? A. No. We found a different range, different line for the vapor pressures. The vapor pressures we obtained were much higher than obtained by Mr. Taylor.

Q. Have you produced a chart showing the vapor pressures which you obtained on the oil of cassia which you bought in 1938 as compared with that of butyl carbitol as the butyl carbitol is shown on Defendant's Exhibit Q? (948) A. Yes. This is the chart. It shows the vapor pressure of oil of cassia at 20 degrees Centigrade is about .2 of a millimeter. Mr. Taylor's chart shows it as being less than that of butyl carbitol. The vapor pressure shown here is more than ten times as high as that of butyl carbitol at 20 degrees Centigrade.

Charles R. Bragdon, for Plaintiff—Direct.

Mr. Byerly: I will offer in evidence the chart produced by the witness.

(Marked Plaintiff's Exhibit 56.)

Q. Did you purchase some more oil of cassia during the present year? A. We did.

Q. How did you find the vapor pressure of that compared with the vapor pressure given by Mr. Taylor? A. It checks pretty closely with that given by Mr. Taylor.

Q. Have you ascertained whether or not the composition of oil of cassia is constant or variable over the years? A. It varies considerably according to all the information we have been able to obtain.

Q. Is that information in the nature of published data? A. It is. I have a publication here "The American Perfumer" which has an article by Dr. F. D. Dodge, the chief chemist of Dodge & Olcott, which describes the difficulty that has been experienced in the adulteration of oil of cassia coming from China, the interior of China, and various differences that have been found to (949) exist in various samples of oil.

Q. Does all oil of cassia come from China? A. It does.

Q. Does oil of cassia have any odor? A. It has quite a strong odor—the odor of cinnamon.

Q. Is a part of oil of cassia volatile at room temperature? A. A considerable part of oil of cassia is volatile at room temperature, and the odor is due partly to that volatile part.

The Court: Is the odor a result of the volatile part? When a thing is volatile it has an odor?

The Witness: That is correct.

The Court: Which smells in evaporation?

The Witness: That is true.

Q. Has your examination of oil of cassia been sufficient to enable you to say whether an ink made with a solvent of oil of cassia would produce any odor when spread out on the rolls of a printing press? A. It certainly would. The

test made by defendant's witness, Mr. Taylor, with an ink in which he had used oil of cassia caused the courtroom to be pretty well pervaded by that odor.

Q. And that was only a very small amount? A. It was a very small amount that he had spread out there. If the ink was spread out on a large surface, such as a traveling web and the rollers of a printing press, you (950) would have a very penetrating odor.

Q. Mr. Taylor suggested on page 535 of the minutes that toluol had about the same vapor pressure as water. Have you checked that to see how closely the vapor pressure of toluol is to that of water? A. It is a little higher, around 2 centimeters at room tempeature.

Q. Now you demonstrated in your *prima facie* ink, which you said had a vapor pressure of 1½ centimeters— A. Secondary butyl acetate.

Q. That was closer to water than the toluol suggested by Mr. Taylor, is that right? A. That is correct.

Q. Can you demonstrate the effect of differences in vapor pressure in the evaporation of thin films of liquid using secondary butyl acetaate, which you said had a vapor pressure of 1½ centimeters, the toluol suggested by Mr. Taylor which you said has a vapor pressure of about 2 centimeters, and ethyl alcohol which you previously stated has a vapor pressure of about 4 centimeters. Will you please tell us exactly what you do as you do it, Mr. Bragdon, so that the record will have it?

The Court: Read that question to me, Mr. Stenographer.

Question (read).

The Witness: Will you hand me the newspaper there? I do not want to spoil the finish.

(951) (Newspaper handed to witness by Mr. Byerly.)

Q. Just describe what you have here and what you are doing, Mr. Bragdon. A. I have here a small glass plate,

the surface of which has been ground to make a slightly roughened surface so that the liquids will spread more readily and so that their evaporation can be more easily followed.

I have a bottle of absolute alcohol, pure ethyl alcohol, and one of secondary butyl acetate.

By means of droppers I place two drops of each of these liquids at the top of the glass, and then with the edge of another smooth glass plate I draw them down so as to make a uniform thin film of each.

You can see the liquid by the dark areas. The one on the left is alcohol; the one on the right is the secondary butyl acetate.

The Court: What are you waiting for now, to see how quickly they dry?

The Witness: I am waiting now to see how quickly they evaporate.

The Court: The carbitol is evaporating.

The Witness: This is the alcohol (indicating). That is drying a little quicker.

The Court: This is drying a little quicker, isn't it—oh, no; it is a pretty tight race.

(952) Q. It is the alcohol that won by a small margin, isn't it? A. The alcohol won by a small margin.

The Court: The right one.

The Witness: I will say this disappeared first. I will try it again. It doesn't take but a minute to make the test.

(Demonstrating.)

Mr. Free: Which is which?

The Witness: This is the alcohol (indicating).

The Court: On the left.

The Witness: The alcohol is on my left.

Q. You are trying this the second time, Mr. Bragdon? A. I am trying this the second time.

The Court: The one on the right is going very fast.

The Witness: The one on the right was a little faster that time.

The Court: Much faster. The one on the left is still quite a big patch, isn't it?

The Witness: There is.

Mr. Free: Does the effect of the heat of your hand make any difference?

The Witness: We can reverse it. We can make the conditions just as you suggest. (Demonstrating.)

The Court: You have changed positions now? (953) Is the alcohol still on the left?

The Witness: The alcohol is still on the left but I will hold it this way (indicating), so as to place the alcohol on the right.

The Court: The one on the left suddenly starts up like greased lightning.

Mr. Free: The one on the right is dry, isn't it?

The Witness: There is still a slight darkness there. There again, they are close, as your Honor can see.

The Court: Well, the one on the right has not disappeared yet but the one on the left has completely.

Mr. Free: What was the one on the right?

The Witness: This was the alcohol.

The Court: The alcohol has just disappeared, hasn't it?

The Witness: Yes.

The Court: About 30 seconds difference, was it?

The Witness: I will try it once more.

Q. It has been suggested that you turn the glass around before dropping the liquid on so as to be sure there is no

difference in the two parts of the glass. A. I have it reversed now from the way it was before.

By the Court:

Q. Is that glass, as you cut it down taking some of (954) the material off and affecting it? A. It does take a little off. It leaves a uniform film of both liquids on there.

Q. So as to make it a fair test? A. So as to make it a fair test.

Q. Which is on the left now? A. On the left is alcohol.

Q. And on the right is what? A. On the right is the secondary butyl acetate.

(Demonstrating.)

Q. The butyl acetate has now disappeared and a good deal of the alcohol left, isn't there? A. There is. This is the alcohol (indicating).

Q. The secondary butyl acetate has disappeared quicker than the alcohol as a result of these tests, hasn't it? A. In these comparisons it has evaporated just a little faster than the alcohol.

By Mr. Byerly:

Q. Now will you try the toluol against one of the other liquids. A. I will compare the toluol in the same way against alcohol.

The Court: Why do you use that?

Mr. Byerly: That was the subject suggested by Mr. Taylor as having the same vapor pressure as water.

Mr. Free: At what temperature?

(955) Mr. Byerly: At room temperature.

(Witness demonstrates.)

Q. Which are you comparing now? A. The alcohol is on my left and the toluol is on my right.

The Court: The toluol is going faster, isn't it?

The Witness: It is going a little faster now. Toluol has a tendency to spread out a little more readily on the glass than the alcohol does.

It evaporated a little bit faster than the alcohol.

Mr. Free: While you have your apparatus set up I wonder if you would mind trying alcohol and water in the same way.

The Witness: If you will see that we will get an atmosphere without any humidity we will be glad to make that comparison.

Mr. Free: I wish you would try it right here and now.

Mr. Byerly: Your Honor, I think the results of that will certainly show nothing but that it was an obviously damp day. Of course, we will concede that water will evaporate more slowly—if that is what Mr. Free wishes.

The Court: This room is pretty well dried out, isn't it?

(956) Mr. Byerly: If you will look on the window you will see it is coated on the inside with moisture.

Mr. Free: I would like to try this, your Honor. This room isn't very damp.

The Court: Go ahead and try it.

Mr. Free: Let us see what happens.

The Court: State for the purposes of the record what conditions you are going to effect.

The Witness: The water will dry much more slowly in this atmosphere because its effective vapor pressure is very greatly reduced by the vapor pressure of the water that is already in the air.

The Court: It won't affect the absorption of the alcohol?

The Witness: No, because there is no appreciable amount of alcohol vapor in the air.

Mr. Free: I think it would be fairer to the alcohol if we got some room temperature water.

Mr. Byerly: The water seems pretty cold, doesn't it? Where are we going to get it?

Mr. Watson: Out of the thermos. That is the only water available.

The Court: Get some in my room.

(Water obtained from the Judge's room.)

(957) By Mr. Free:

Q. The bailiff has produced a glass of water from the ordinary water-tap. A. I will have to use my finger, I guess, to apply the drops.

Q. You are putting water on the— A. On my righthand side and the alcohol on the lefthand side.

Q. I wish you would time the alcohol evaporation rate. I have 25 minutes after 12 on my watch. A. The water volume seems to be considerably thicker there. Water has a very high surface tension, which means that it tends to draw together in drops.

The Court: The alcohol has disappeared now.

The Witness: The alcohol has disappeared now.

Mr. Free: The alcohol is all gone in 35 seconds.

The Court: And the water is still there. It has not begun to disappear.

Q. Did you try that experiment with water and alcohol after our session the other day, under dry conditions, Mr. Bragdon? A. We were not able to get the right conditions.

Q. You did not try it in a very dry, steam-heated room, for example? A. No.

Q. The water is still about as wet as it was? A. It is beginning to dry now.

(958) The Court: All right, let us get along. This is all very interesting.

Mr. Free: Let the record show that after almost two minutes the water is still pretty wet, isn't it?

The Witness: Yes.

By Mr. Byerly:

Q. In Exhibit 53 in which you compared the formula of the McElroy patent with the formula given by Mr. Carroll, you indicate that in Mr. Carroll's formulas the rosin-oil was nearly twice the amount of the terpineol, while in the formula of the patent the rosin-oil was only 5 per cent of the amount of the terpineol; is there a difference in the vapor pressure of terpineol and rosin-oil? A. Yes, the vapor pressure of rosin-oil is much lower.

Q. Have you prepared a chart showing the vapor pressures of terpineol and rosin-oil? A. I have; it shows that terpineol is very much more volatile than rosin-oil.

Mr. Byerly: I will offer this chart in evidence.

(Marked Plaintiff's Exhibit 57.)

Q. Can you tell us from this chart, Exhibit 57, whether there would be any difference between the vapor pressure of a solvent such as described in the McElroy patent, consisting of 95 per cent of terpineol and 5 (959) per cent of rosin-oil, from a solvent such as that shown in Mr. Carroll's formulas, consisting of 33 per cent of terpineol and 66 per cent of rosin-oil? A. The vapor pressure of the mixture in the Carroll ink would be lower than that of the McElroy patent.

Q. Appreciably lower? A. Appreciably lower, yes.

Q. Have you prepared an ink in accordance with the formula of the Doughty patent, containing 4 parts of terpineol, 1 part of rosin and 10 parts of bronze powder? A. Yes.

Mr. Byerly: I offer the ink produced by the witness.

(Marked Plaintiff's Exhibit 58.)

Q. Will you please open the box in which this ink is contained and show the Court the consistency and appearance of this ink.

The Court: What kind of ink is that?

The Witness: This is ink prepared in accordance with the formula given in the Doughty patent.

The Court: What is the solvent there?

The Witness: Terpineol. The pigment has settled down very hard in the bottom.

Q. Is that a peculiarity of the metallic pigment? A. It is if they are allowed to stand for some time. They are very heavy in specific gravity. You see, the (960) vehicle is very thin there.

The Court: What is the vehicle used for?

The Witness: That is the binder and the solvent.

The Court: What is the solvent?

The Witness: Terpineol.

The Court: It does not run, does it? That could not be used on a press in that shape, could it, in that condition?

The Witness: I think it could. It would be a little thin, if anything, for use on a press. After it is thoroughly mixed up it will become quite thin.

Q. That is, the vehicle of the ink is rather thin and you are now stirring the metallic powder? A. Stirring the metallic powder in, which makes it seem rather thick at present, but when it is fully stirred in it will thin down again.

Q. While you are mixing that, Mr. Bragdon, will you tell us whether terpineol is an aromatic compound or an open chain compound? A. It is an aromatic compound, unsaturated compound.

Q. You are getting that pretty well mixed. What would you say its consistency is? A. It is rather, I would say, on the thin side for a printing ink; a typographic printing ink.

Q. Do you know whether it is the right consistency for (961) use for stamping with a hot die? A. I would say it would be about right for that.

Mr. Byerly: I think perhaps that is sufficient, your Honor.

Q. Mr. Bragdon, have you prepared a statement of the ingredients of the ink given in the specific example of the Jirousek patent, showing the percentage of the different ingredients and the different classes of ingredients? A. I have, this is the statement.

Mr. Byerly: I offer this in evidence.

(Marked Plaintiff's Exhibit 59.)

Q. Your statement, Exhibit 59, shows the presence of a solvent consisting of three different ingredients, does it not? A. It does.

Q. How does the vapor pressure of that solvent at room temperature compare with that of butyl carbitol? A. It is about 200 times as high.

Q. Have you made any investigation in your laboratories as to the effect of adding a small amount of wax to a volatile solvent? A. We have.

Q. What did you find out? A. We find that the addition of paraffin wax lowers the vapor pressure very slightly, possibly 5 or 10 per cent.

Q. Does it have any effect on the evaporation? A. It does have an effect on the evaporation, particularly (962) if the solvent is allowed to remain quiet. As the first portions of the solvent evaporate a film of wax is formed on the surface, which slows up the evaporation, but if the liquid is kept in motion the effect is very slight.

Q. That is because— A. Because the skin of wax cannot form.

Q. In the demonstration which was made here by Mr. Taylor of a solvent with and without w[illegible]was that made under conditions in which a film of wax could rise and delay the evaporation? A. It was. The drops were placed on a sheet of paper and the evaporation was allowed to take

place without stirring it up, so that a film of wax could form on the surface and delay the evaporation.

Q. Would that occur on the ink feeding rollers of a printing press? A. Practically none at all, because the rollers would be moving so fast that the film of wax would not have a chance to form.

Q. Have you a sample of the ink vehicle described in the McElroy patent before the pigment is added to it? A. I have. This is it.

Q. What kind of Cumar resin did you use in making that up? A. We used a powdered Cumar resin as described in the patent.

Q. That ink vehicle is much more liquid than the (963) vehicles ordinarily used in typographic inks, is it not? A. It is.

Mr. Byerly: I will offer in evidence the ink vehicle of the McElroy patent produced by the witness.

(Marked Plaintiff's Exhibit 60.)

Mr. Byerly: That is all.

Cross examination by Mr. Free:

Q. Mr. Bragdon, I wish you would take your Plaintiff's Exhibit 45 and take your pencil and draw on it the distillation curve for butyl carbitol.

Mr. Byerly: Your Honor, I object to this. The butyl carbitol distillation curve is not criticized as a defendant's exhibit and I see no reason why it should be placed as our exhibit in criticism, which is for a different purpose.

The Court: Have him make it on a separate piece of paper.

Mr. Free: I want him to compare the two. It does not do any harm.

The Court: You cannot change someone else's exhibit.

Q. Will you draw a comparative curve on another piece of paper, between butyl carbitol and 502-C oil, any one of those curves shown on Exhibit 45.

Mr. Byerly: This Exhibit 45 is transparent. (964) Can you not make the comparison suggested by counsel by placing it over Defendant's Exhibit B-1, containing the boiling range of butyl carbitol?

The Witness: I can do that.

Mr. Free: I would rather have you draw it on a separate sheet, so we can see how they look. Roughly, you can place one over the other as you look.

Mr. Byerly: I think the witness should not be asked to copy one of their curves again. He has shown the comparison.

The Court: Well, let him do it.

Q. Take a piece of yellow paper. That will do all right, and mark the temperatures up one side and then just rough in two curves, will you? A. (Witness complies.)

Q. Now, will you mark the lower curve "butyl carbitol"? A. (Witness complies.)

Q. Now, on that same curve I wish you would place the curve marked "I. P. I. Solvent" on Plaintiff's Exhibit 46.

Mr. Byerly: Which of the curves?

Mr. Free: Either one.

A. (Witness complies.)

Mr. Free: I offer in evidence as Defendant's Exhibit R-2 the comparative curves between butyl carbitol, the plaintiff's solvent, and defendant's solvent.

(965) (Marked Defendant's Exhibit R-2.)

Q. Referring to Exhibit R-2, Mr. Bragdon, the I. P. I., or plaintiff's solvent, and the 502-C solvent are above butyl carbitol, are they not? A. They are.

Q. Quite a distance? A. It looks like quite a distance on that chart, because the chart is cut off at about 200 degrees Centigrade. Of course, if you started from 20 degrees Centigrade and ran it up to that point the difference would not appear so great.

Q. It is a difference of approximately 230 to 270, the first for butyl carbitol and the second for defendant's and plaintiff's solvents, is that right? A. That is correct.

Q. The oil of cassia, which you said you obtained, contains some adulteration, as I understand it? A. We got it from the most reliable supplier that we could, and we assumed that it was pure oil of cassia, as pure as oil of cassia can be obtained. There is a wide difference in the percentage of cinnamic aldehyde.

Q. It was not U. S. P.? A. Yes.

Q. But U. S. P. specifications prohibit adulterations, do they not? A. They do not prescribe definitely how any adulteration is to be determined. They merely give certain tests which are intended to describe a pure oil, but apparently a good many pure oils and some adulterated (966) oils might come under the same specification. The books on essential oils state that some oils of cassia containing as little as 40 per cent of cinnamic aldehyde have been received, which apparently so far as could be determined were still pure oils of cassia.

Q. I would like to know whether you agree with this statement:

> "A mixture of nitrocellulose solvents and wax solvents and containing a proportion of wax very slight with respect to the total amount of the composition but sufficient to substantially prevent evaporation at, say, 70 degrees F., while not materially preventing evaporation at temperatures somewhat above 100 degrees F."

Has that been your experience with wax in solvents? A. If the film is allowed to remain quiet it takes very little wax to prevent evaporation.

Q. A very small percentage would do that job all right? A. Yes.

Q. A thin film of ink is always spread on the type, isn't it, in printing? A. It is.

Q. And the wax would retard evaporation under those conditions? A. I do not think it would have a change to retard it, not in high-speed printing.

Q. But it does retard evaporation, the wax does? (967) A. The film where the wax is allowed to form a skin on the top.

Q. How did you determine the vapor pressure of the oil of cassia which you tested? A. We determined that in an apparatus similar to the one which you saw.

Q. That was not a Brewer and Gardner apparatus? A. No, it was not.

Q. And it is the Brewer and Gardner apparatus in which butyl carbitol was measured in accordance with the patent in suit, wasn't it? A. The patent mentions the Brewer and Gardner determinations as having been published.

Q. And so your oil of cassia determinations were obtained by different apparatus than the vapor pressure curves were obtained in the patent in suit, that is right, isn't it? A. They were obtained by an apparatus which we believe to be much more accurate than the Brewer and Gardner apparatus.

Q. But different method? A. Different.

Q. You mentioned the Doughty patent, and I ask you whether you noted at line 50 on the firsf column, page one, that it states that the ink should have "a consistency permitting transference of the ink through inking rolls to the type or die", you understand that? A. Yes, I do.

(968) Q. And that same specification is required of typographic printing inks today, is it not? A. Yes.

Q. And also at the bottom of the second column of page 1 of the Doughty patent it mentions, in line 103, the same thing, that the resin is dissolved in the solvent to produce a vehicle of the desired consistency. That, again, you

understand to be the consistency desired for printing inks generally, is that right, to enable transference from the rolls to the type? A. Yes, although, of course, the patent refers specifically to stamping inks.

Q. Well now, I wonder if it does. Look at the second column of page 2, line 67. It states:

> "The color will depend upon the particular pigment employed which may be other than metallic in character."

Then it goes on to say:

> "The ink described, though particularly suitable for bookbinders' use, will serve other purposes of decorative printing."

Mr. Byerly: I think the witness should have a copy of the patent.

Mr. Free: By all means. I thought he had one.

Q. (Continuing) That statement I just read indicates (969) the ink is not confined to stamping ink, in your opinion, doesn't it? A. Possibly not strictly confined to that.

Q. You know enough about the solvents mentioned in the Doughty patent, such as terpineol, benzyl alcohol, terpinyl acetate, benzyl acetate and ethyl benzoate, to agree with him that they all have a low evaporation rate at room temperature? A. Fairly low, yes.

Q. And also when you heat them the vapor is evolved rapidly and they dry quickly, do they not? That is typical of this whole group of solvents we have just been talking about, isn't it? A. I do not know that you can limit it to this group entirely.

Q. There are more in that group than I have just read to you? A. There are.

Q. Now, will you look at the McElroy patent, No. 1,450,692. You will notice in line 88 of the second column

of page 1 that he lists solvents, such as terpineol, pine oil, rosin-oil, and high-boiling mineral oils. Those are, again, of the class we have been talking about, that is, they are slow or do not have any evaporation rate to speak of at room temperature, but they do evolve and vaporize when heated, do they not? A. Terpineol we have already discussed. Pine oil evaporates fairly readily at room temperature, and, of (970) course, the high-boiling mineral oils will include some that will evaporate fairly rapidly at room temperature and some would practically not evaporate at all.

Q. But they are all of this class that are supposed to be stable at room temperatures, are they not? A. I would not say that pine oil is.

Q. How about rosin-oil? A. Rosin-oil would be stable at room temperatures, but would not evaporate quickly when heated.

Q. If you mixed it with terpineol you would get sort of an average between the two so far as vaporizing characteristics were concerned, wouldn't you, somewhere near the average? A. Somewhere near the average, yes.

Q. If you mixed more rosin-oil than you have terpineol, you get a very slow evaporating mixture, do you not? A. Yes.

Q. And if you mix less than that you get a more rapid evaporating mixture, is that right? A. You would have, depending on the proportions of the two. You might in one case have something that would evaporate faster than you want to and in the other case much slower.

Q. You mix them up the way you want to to get the rate of evaporation that you like, isn't that so? A. You cannot always get an average evaporation rate by (971) making mixtures of that sort.

Q. You understand as stated in the passage beginning with line 60 in the first column of page 2, that he is talking about a mixture of terpineol and rosin-oil "as the con-

stituents preferred of our binder solvent vehicle" in a general way there, isn't he? A. Apparently.

Q. And he gets that mixture to obtain the requisite degree of volatility to be driven off by the temperature used as he states in the second column on page 2, line 68, is that right? A. That is correct.

Q. Down in line 81 of the same column, the second column of page 2, he says:

> "Within the limitations imposed by these criteria, the binder vehicle may be any of the solvents named or suitable combinations thereof."

You notice that? A. I do.

Q. And that, of course, means that you can add rosin-oil and terpineol, or rosin-oil and some of these other solvents, and get anything you like to suit your requirements, is that right? A. If you had an excess of rosin-oil it would behave more as a plasticizer than as a solvent, and you would have practically only the small amount of terpineol as the solvent itself.

Q. But you understand him to include rosin-oil in this (972) patent as a solvent? A. He refers to it that way.

Q. And you would agree with Mr. Taylor, would you not, in the mixture of rosin-oil and terpineol the rosin-oil acts both as a solvent and also as a plasticizer to a certain extent at least? A. It is so slightly volatile that it would have very little of the properties of an ordinary solvent.

(Recess to 2.00 p. m.)

AFTERNOON SESSION.

CHARLES BRAGDON, resumed the stand.

Cross examination continued by Mr. Free:

Q. Mr. Bragdon, we were on the McElroy and Clarke patent, do you remember? A. Yes.

Q. I think you described the example given in lines 16 to 35 inclusive, did you not?

Mr. Byerly: May I furnish him with a copy of that patent (handing to witness).

A. On page 1?

Q. On page 2. A. (After examining) Yes.

Q. And you understand that just to be an example, don't you? He says so in fact. A. He says so.

Q. The idea being that, as he says in line 33, "The ink resulting is of pasty and semi-fluid consistency, similar to that of printing inks generally." A. It so (973) states.

Q. Yes, and then down here in line 44 he says, "The proportions above exampled may be varied somewhat without appreciable variation of the production."

He is still talking about that example up there, is he not? A. Evidently.

Q. Over in the second column of page 2 he describes the ink in general terms there, line 96, where he says, "Preferably, therefore, the described composition should be used as an ink at a temperature substantially that of the boiling point of the solvent vehicle." What do you understand that to mean? A. That means that it is used on a hot die which is heated up to approximately the boiling point of the solvent.

Q. So that the solvent will be driven off quickly, is that right? A. So that the solvent will be driven off, yes.

Q. Then he goes on to say in line 99, "As will be obvious, however, the ink set forth may be used at lower temperatures, or cold, and the impression artificially dried thereafter". Now that describes a modern heat-set press action that we have been talking about, doesn't it? A. I think that is intended to refer still to the use of a stamping iron.

Q. Let us see. He says that he puts the ink in the (974) fountain cold, doesn't he? A. I don't see that he mentions "fountain".

Q. "As will be obvious, however, the ink set forth may be used at lower temperatures, or cold." Now you put ink in a fountain, don't you? A. In typographic printing, yes.

Q. Yes, or almost any other kind of printing ink, don't you? A. Yes.

Q. And that is what you would do with these modern heat-set presses? A. Yes.

Q. And then you print with it, and as he says here, "the impression artificially dried thereafter." That is what happens in a modern heat-set press, doesn't it? A. I do not think that he has the typographic press in mind at all there.

Q. Well, I did not ask you that. I asked you whether or not that statement describes the modern heat-set press action. A. In general it does.

Q. That is, they print the ink cold and then put the paper through a heater and that touches off a solvent and the ink is dried, is that right? A. That is correct.

Q. Now this Cumar situation, I would like to ask you to turn to page 1, the second column, line 66, where he says:

> (975) "Our invention consists in the discovery that a coumarone resin has the desired utilities"

and so forth. That is not limited to any one particular Cumar is it? A. It is not but he has referred in the para-

graph just before to either resin or a neutralized rosin typified by an ester of resin.

Q. Yes. A. Which is a solid resin similar to that hard Cumars, and it would naturally be assumed that he intended to use the same type of coumarone, especially since he mentions the powdered Cumar further down.

Q. Now powdered Cumar is a coumarone resin, isn't it? A. Yes.

Q. And so is the Cumar you were talking about this morning, this viscous Cumar. That is also a coumarone resin? A. It is. It comes in the general class.

Q. And those could be generally called non-acid synthetic resins, could they not, as he says in lines 61 and 62? A. They could be.

Q. Now I wish you would turn back to the Doughty patent again. He says in line 72, the second column of page 1:

> "Solvents boiling materially below 200° C. are unsuitable because the ink dries too rapidly (976) on the rolls and becomes gummy. Solvents boiling materially above 300° C. are likewise unsuitable because the ink cannot be successfully dried except by the application of impracticably high temperatures."

He gives us the two extremes of what he wants there, doesn't he? 200 is the low and about 300 is the high, is that right? A. It sounds to me as though he meant there——

Q. Never mind what he meant. Tell us what you understand that to mean. A. I understand it to mean solvents whose boiling range is within the 200 and 300-degree limit in general.

Q. That is, 200 is the bottom and 300 is the top, is that right, within that range somewhere? A. Yes.

Q. Yes. Now on the second page of the Doughty patent, lines 16 to 20, he talks about using these "paraffin hydrocarbons, for example, those present in fractions of kerosene boiling above 250° C. at normal pressure." Now that is

half way between 200 and 300 that he mentioned, isn't it? A. The 250 point, which would be the initial.

Q. Yes, and then he has the top of 300 which he states on the first page? A. He does not say anything about 300 here. If he took a kerosene of the type that (977) was available in 1922, which had an end point of 300 degrees and fractioned it to take off the part boiling above 250 degrees he would have a residue, the end point of which would be above 300 degrees.

Q. Well, it would be about between 250 and 300? A. It would be about between 250 and possibly 315.

Q. He says, if you will remember, at page 1, line 75, that he wants solvents that do not boil materially above 300, do you remember that? A. I take that to refer chiefly to these that he mentions by name below, such as benzyl alcohol, which are articles of commerce of the essential oil type.

Q. Some substitute of terpineol, for example, in lieu of that? A. Yes.

Q. I call your attention to line 20 of page 2. Let us turn back to that. Let us turn back to where he is talking about kerosene. He says that this kerosene fraction boiling above 250 may be employed instead of terpineol. He means that to be a substitute for terpineol there too, doesn't he? He says so? A. He says so.

Q. So we have a kerosene fraction cut between 250 and 300 described in the patent, do we not? A. As I said before, if you would cut such a fraction from a kerosene having an end point of 300 degrees, (978) you would get a residue which would have a much higher end point because that is the characteristic behavior of petroleum hydrocarbons of the kerosene type.

Q. It is about 315, I think you said? A. Somewhere in that neighborhood.

Q. Then we have, according to the patent, a cut between 250 and 300, which is 50 degrees, or between 250 and 315,

which is 65 degrees, is that about right? A. It could be even higher than that from the kerosenes of 1922.

Q. I will show you Plaintiff's Exhibit 45, and see whether you agree with me or not that the boiling range of what you call 502-C oil, the red curve which I believe—is this yours or Taylor's? A. That is Taylor's.

Q. Let us take yours, the one marked Bragdon. And you have an initial point there of 260? A. That is right.

Q. And an end point of 289, or somewhere around there, is that right? A. Yes.

Q. And that is within the range we have been talking about? A. That is a very much narrower range.

Q. Yes, but it is within 250 to 300 and 250 to 315? A. Within that range, yes.

Q. I do not know whether I understood you to mean that (979) there is a difference between distillation temperatures and boiling range temperatures, is there? A. No, I understand that they are used interchangeably.

Q. The difference is principally where you put the thermometer? A. No, true boiling temperature is usually determined by putting the thermometer in the vapor.

Q. When you put it in the liquid you get a little lower temperature or higher? A. Usually a little higher.

Q. But substantially it is the same, the distillation range and the boiling range? A. Yes.

Q. I think you said you were an employee of the plaintiff company here? A. I am.

Mr. Free: That is all.

Re-direct examination by Mr. Byerly:

Q. You were asked on cross examination about the machine in which the vapor pressure of oil of cassia was measured, in the plaintiff's laboratories; was that the same machine on which the other vapor pressures to which you have referred in your examination, including that of butyl carbitol, were measured? A. It is exactly the same machine.

It employs the same principle as the Brewer and Gardner instrument, but it has some refinements which make it more accurate than Brewer and Gardner's.

Q. Looking at your Plaintiff's Exhibit 5, giving (980) vapor pressure curves for butyl carbitol, if I understand your previous testimony correctly the solid line indicated the values determined by your machine, and these three points here indicated the values obtained by the Brewer and Gardner method by Mr. Taylor, is that correct? A. That is correct, the solid line indicates the vapor pressures that we got after removing just 10 per cent of the original sample that we took.

Q. And your line checks very closely with Mr. Taylor's determination by the other method, does it not? A. It checks almost identically with Mr. Taylor's measurements.

Q. I show you Defendant's Exhibit L-1, which is a picture of the machine used by Mr. Taylor. When this machine is in operation what happens to any vapor that comes off the liquid? A. The vapor that is given off by the liquid in the tube *a*, which is where the vapor pressure is being actually determined, rises and passes over through the side tube *c* into the flask *e*, which is contained in a freezing solution.

The Court: How do you know that? Are you familiar with that apparatus? Have you ever worked with one of them?

The Witness: I have worked with one almost identically like that.

(981) Mr. Byerly: It is described in the literature, your Honor.

The Court: Is that standard mechanism?

The Witness: It is the apparatus described by Brewer and Gardner and which has been very widely used.

Q. I show you a drawing, which I will ask to be marked for identification.

(Marked Plaintiff's Exhib' 61 for identification.)

Mr. Free: It sounds like the opening of a new line on re-direct examination, another different apparatus than we talked about.

Mr. Byerly: It is the same apparatus we talked about all through the case.

The Court: What apparatus is it?

Mr. Byerly: This is the plaintiff's vapor pressure-measuring apparatus.

The Court: It has been referred to heretofore?

Mr. Byerly: Yes.

The Court: Was there anything said about it on cross examination?

Mr. Byerly: Yes, there was. He was asked whether the apparatus in which he measured oil of cassia was not different from the Brewer and Gardner apparatus.

The Court: All right.

(982) Q. Now, is this drawing, marked Exhibit 61 for identification, a drawing of the vapor pressure measuring apparatus in the plaintiff's laboratories? A. It is. It is a schematic drawing showing that apparatus.

Q. The liquid whose vapor pressure is to be measured—A. Is placed in this vessel here.

Q. That vessel 11? A. That vessel 11.

Q. Does that correspond to this flask 1 in the Brewer and Gardner apparatus? A. It does.

Q. What is this graduated tube marked 31? A. That is a tube which is very carefully graduated. Into it any portion desired of the original sample can be distilled and measured accurately.

Q. In the use of the machine is that tube 31 cooled by ice or something like the bulb *c* in the Brewer and Gardner machine? A. It is cooled by a very cold freezing mixture.

Q. But this tube 31 differs from the bulb *c* in the Brewer and Gardner machine, in that it is provided with means

for measuring the exact amount that has been distilled over, is that correct? A. That is correct.

The Court: It has a scale on it?

The Witness: It has a scale on it, yes.

Q. When the measurements are actually made, that is, (983) by reading the vapor pressure—first let me ask you whether this device marked 22, 25, 23 and 24 is a mercury tube for measuring pressure? A. That is. It is called a mercury manometer, and it is the equivalent of two barometer tubes.

Q. There is a similar mercury manometer in the Brewer and Gardner machine shown in Exhibit L-1? A. There is. It is the tube shown at *g*.

Q. When the readings are being made on this manometer in the Brewer and Gardner machine, is this flask 1, which contains a liquid, connected to the tube *g*? A. It is connected with that tube, so that any vapor can distill over during the course of the measurements.

Q. In your machine have you some way of cutting off connection between this tube, 11, where the liquid is, and the trap 31, during the time that you are actually reading the manometer? A. We do have a means of doing that. We have a tube filled with mercury here, connected with the bottom of this U-tube, and the mercury can be forced up into these U-tubes so as to close off this vessel here and leave it connected only to the manometer. The vapor is confined in the space between the surface of the mercury, 22, in the lefthand manometer tube, this flask here, and the surface of the mercury 43 in this mercury seal.

(984) Q. Then is it correct to say that in your machine you have measured the exact amount of liquid distilled off when you have heated this, at such time as you wish, and then prevent any further vapor from going over, and read the vapor pressure? A. That is just what we do.

Q. And in the Brewer and Gardner machine throughout the use of the machine a little vapor is being distilled off, and the machine is read while that has happened? A. That is true, and in order to make these readings accurately it is necessary to read very fast, otherwise the reading changes.

Q. And in your machine you have time enough to make these readings because the vaporization is stopped during that— A. The vaporization is stopped and the apparatus can be held in exactly that same condition as long as desired, without any change. Ours is a static——

The Court: That is all. Just answer the question. Do not volunteer anything.

Q. Would it be fair to say that your machine is a static machine and the Brewer and Gardner machine is a dynamic machine, referring to this difference between the fact that you stop the vaporization while measuring and he does not? A. That is correct.

Q. Is the use of a static machine for measuring vapor (985) pressure referred to in textbooks, do you know? A. It is.

Q. I call your attention to some pages from "Elements of Physics", by Robert Andrew Milliken——

Mr. Free: Your Honor, we heard him say a while ago these apparatuses are essentially the same. Now, we have it they are different.

The Court: This is introducing something new in the case?

Mr. Byerly: I think we brought this out at the start, and Mr. Taylor has actually seen this machine.

The Court: Seen this machine here?

Mr. Byerly: Yes, he has been up there and examined it.

The Court: Did he testify about this machine?

Mr. Byerly: He did not mention it, and we under-

stood from his remarks up there that he was satisfied that it was an accurate way of measuring vapor pressure.

The Court: He did not say anything about it in court.

Mr. Byerly: No, but the reason it is brought in at this time, your Honor, is because Mr. Bragdon testified before that it was measured in this machine, and there has been no criticism of it.

The Court: That would have been the time to have gone into the detail of it when he mentioned it before, (985a) but nothing was said about this by the defendant in their case, so I think it is not proper rebuttal.

Mr. Byerly: I think that it is fair so far, in view of his asking whether the machines were different. Having gone this far I shall go no further.

The Court: All right, let it be admitted in evidence.

Mr. Byerly: I offer in evidence the drawing marked 61 for identification.

(Plaintiff's Exhibit 61 for identification received in evidence.)

(985b) Q. Mr. Bragdon, I call your attention to the Doughty patent at page 2, line 72. What do you understand by the expression "decorative printing" used there? A. That would be printing made with a hot——

The Court: Just a minute. Is this gentleman qualified to answer this question?

Mr. Byerly: Well he was asked about similar statements on cross examination. If he does not know I presume he will say so.

The Court: I can imagine a good deal what decorative printing is like. Anybody can. I don't know that I need an explanation by an expert.

Mr. Byerly: I merely wanted to bring out this.

Q. Is it the same thing as ordinary printing? A. I would say ordinary printing would not be called decorative printing.

Mr. Byerly: That is all.

Re-cross examination by Mr. Free:

Q. These magazines that we have been talking about, they have pictures in them that are made with these processes. Wouldn't they be called decorative? A. I would not call them decorative, no.

The Court: Give us an example of decorative printing—an illuminated Bible?

The Witness: An illuminated Bible.

(1986): The Court: Well that is not print.

The Witness: Or a gilt decoration. It might be applied to a lady's handbag.

Q. How about the pictures of good-looking girls in the advertisements in magazines; isn't that decorative printing? A. Some might consider it so.

Mr. Free: That is all.

Mr. Byerly: That is all.

SIDNEY SATENSTEIN, called as a witness on behalf of the plaintiff in rebuttal, being duly sworn, testified as follows:

Direct examination by Mr. Byerly:

Q. Where do you live, Mr. Satenstein? A. 145 Central Park West, New York.

Q. What is your business? A. Book manufacturing.

Q. With what company are you connected? A. American Book Stratford Press.

Q. Is that a company which prints books? A. Yes, sir.

Q. Have you any connection with a company called the Alchemic Gold Company? A. I was president of that company.

Q. You say you were president of that company? A. That is right.

Q. During what period were you president of it? A. Oh, from its formation in about 1921 to approximately (987) a few months ago.

Q. I show you a copy of the Satenstein patent No. 1,460,391, which was issued to the Alchemi Gold Company for a method of stamping book-bindings and the like. Is that a patent for an invention which you made? And a patent which is owned by the Alchemic Gold Company (handing to witness). A. That is correct.

The Court: Who is the patentee?

Mr. Byerly: This gentleman.

The Court: What is the number of that patent?

The Witness: No. 1,460,391.

Mr. Byerly: That is Plaintiff's Exhibit 33, your Honor. It is already in evidence.

Q. What kind of a machine is shown in that patent? A. It is what is generally known as a Colts Armory or John Thompson press.

Q. Is there any arrangement for heating the die or type which it contains?

Mr. Free: Now just a minute. I would like to know the relevancy or materiality of it. This patent is not in suit here, nor been set up by the defendant.

The Court: Has it been plead?

Mr. Free: No, not by me, not by the defendant.

Mr. Byerly: Your Honor, as it appears from the patents on which Mr. Free has relied, the McElroy

and (988) Doughty patents, they were issued to the Alchemic Gold Company, and this gentleman knows more about how those inks were used, I think, than anyone else.

The Court: Ask him that, but you are asking him about a patent here that is wholly irrelevant, so far as I can see.

Q. Is your company the owner of two of the patents contained in Defendant's Exhibit G, namely, Doughty patent No. 1,439,696 and McElroy patent No. 1,450,692? A. Yes, we are the owners of them.

Q. I show you also a copy of Defendant's Exhibit Q-2, the Doughty patent No. 1,439,695. Is that a patent owned by your company, the Alchemic Company? A. Yes.

Q. Has your company used the inks described in this Doughty patent and in the McElroy patent which I showed you? A. It did; yes, sir.

Q. For what purpose were they used? A. Used them for stamping book-bindings and the like.

Q. What sort of a device did you do the stamping on? A. On Colts Amory press, John Thompson press, Chandler Price press.

Q. Are those presses of the type shown in your patent which I showed you a few minutes ago? A. Yes, they are.

Mr. Free: That has been excluded, your Honor.

(989) The Court: What is?

Mr. Free: He is referring to that Satenstein patent which was excluded.

The Court: Oh, yes; strike it out.

Mr. Byerly: I respectfully except to that, your Honor. It explains how he uses the inks.

Q. Will you describe the type of press on which you used these inks? A. Yes. The inks we used on a press with a swinging platen, the ink was placed in the fountain

or directly to the rollers. The ink rollers would pass over a chase containing the die or other product which was to be transferred to the book cover. Upon application of the swinging platen to the die that was held in the chase an impression of the ink that had been placed there by the rollers was transferred to the cover. The die was heated and the ink would dry on impact.

Q. About what temperature was the die? A. As near as I recall we never could get accurately what it was, but we used to figure it would be somewhere between 350 to 400 or 450 degrees Fahrenheit.

Q. And that die pressed the ink into a cloth or binding of some sort? A. It did.

Q. And where was the die when the ink was drying? A. Did you ask where the die was?

Q. What was the position of the die during the time (990) the ink was drying? A. In the chase.

Q. You have a heated die? A. Yes.

Q. Or a heated type, if you want to look at it that way, which is pressed down against whatever you are printing on? A. No. The platen on which the cover rested was pressed up against the die.

Q. I see. And did the ink dry while it was being pressed between this hot die and the platen? A. During the moment of impact.

Q. When you were using these inks for making book covers was your company also doing ordinary printing on paper? A. Yes.

Q. Did you use these inks, these Doughty and McElroy inks, in ordinary printing? A. No.

Q. Why not? A. We instigated the manufacture and invention of this ink primarily for the purpose of substituting an ink for what was known as imitation flat leaf, gold leaf, bronze leaf, and therefore it was not our prime purpose. We, however, felt that we would have a very big market for an ink that would print as a gold ink, but whatever efforts we made were not very successful to be used as a gold ink printing on paper as distinguished from stamping on paper.

Q. And it was for that reason that you limited its use to this hot stamping ink? A. That is correct.

(991) Q. You weren't successful in using it cold? A. That is right.

Mr. Byerly: That is all.

Cross examination by Mr. Free:

Q. Mr. Satenstein, you did try to print or stamp on paper with these inks, didn't you? A. That is right.

Q. It worked pretty good, didn't it? A. No, sir.

Q. Do you remember when Professor Doughty sent you some size to put on the paper? A. Yes.

Q. And that was to fill the pores of the paper? A. Yes.

Q. So that you could stamp on it? A. Yes.

Q. And after you had so sized the paper you did stamp on it with this Alchemic Gold, did you not? A. That is right.

Q. And you got pretty good results, didn't you? A. Yes.

Q. You do printing now, don't you? A. We do.

Q. Paper that you use usually comes in sized now, doesn't it? A. Not for this purpose.

Q. Well, a lot of the paper that you use is sized? A. Yes.

Q. You know there is sized paper on the market? A. Yes.

Q. Was there sized paper on the market in 1922? A. Some types of sized papers.

(992) Q. But not for your purpose at that time? A. Not for printing. It was for stamping.

Q. And you found that the stamping worked pretty good on sized paper in 1922? A. Yes.

Q. I show you four samples of gold on paper, entitled "The Cart of Many Colors", and ask you if you ever saw that before (handing to witness)? A. Yes, I have seen these.

Q. Who made them? A. They were made in our place.

Q. In your presence? A. They were.

Q. And whose writing is that on the back of those cards? A. That is mine—yes, that is mine.

Q. How long ago were these made? A. Oh, I should say about 20 years ago.

Q. You do printing, don't you, now? A. Yes.

Q. Quite a bit of it? A. Yes.

Q. For a 20-year old job they still look pretty good? A. Proud of it.

Mr. Free: I offer in evidence the samples of Alchemic Gold printing identified by the witness as Defendant's Exhibit S-2.

(Marked Defendant's Exhibit S-2.)

Q. Now you have a series of patents, as I understand it, issued to you by Mr. Doughty? A. Yes.

Q. And he was the professor of chemistry at Amherst? (993) A. That is right.

The Court: Where?

Mr. Free: Amherst, Massachusetts.

Q. You were one of his students, weren't you? A. No.

Q. Well you consulted him on some of your problems? A. That is right.

Q. And he would make up vehicles for inks for you? A. That is right.

Q. And you paid him a royalty? A. That is right.

Q. For every pound of this ink that you sold? A. That is correct.

Q. About how many pounds of this ink did you sell in these 20 years? A. Oh, there was a stretch I should say of about ten years during which we sold probably 5,000 pounds—five to seven thousand pounds a year.

Q. And then you sold out your patents? A. That is right.

Q. In 1933? A. Yes.

Q. And you kept for yourself the use of the ink in the stamping field, did you not? A. We did.

Q. And you sold out the patents in the remaining fields, including typographic? A. Well, we merely withheld for ourselves a license to use that and sell that ink in the same way that we had been selling it.

(994) Q. Yes, but you sold the other fields to this purchaser? A. Sold the patent.

Q. I see. And who was this purchaser? A. Levey & Company—Frederick Levey.

Q. They make and sell what kinds of inks, do you know? A. Inks for the printing field.

Mr. Byerly: I object, unless he has personal knowledge of what the Levey Company is doing.

The Court: Well, let us not go into that.

Mr. Free: I asked him if he knew. That is the scope of my question.

The Court: He just knows the customer. He is not a member of the firm. I will sustain the objection.

Q. I show you a certified copy of an assignment of certain Doughty patents, and ask you if that is your signature under the name Alchemic Gold Company (handing to witness)? A. Yes, that is my signature.

Q. Does that document represent the sale of these patents to the Levey Company? A. To the best of my knowledge, yes.

Mr. Free: I offer in evidence as Defendant's Exhibit T-2 the assignment of the Doughty patents to Frederick H. Levey & Company in the fields of letterpress, offset, lithographic and intaglio printing, as stated in the assignment.

(995) (Marked Defendant's Exhibit T-2.)

Q. Now as I understand it, Mr. Satenstein, this ink that you have been using, which you have called Alchemic Gold, dried on the application of heat? A. Yes.

Q. And that was after the ink was applied to the subject, whatever it was, paper or a book back? A. No, that was simultaneously with the impact of material to be stamped to the die.

Q. Yes, but it was on the paper when it dried, on the paper or book back when it dried, wasn't it? It had to be, otherwise it would not remain on the paper; isn't that right? A. Not necessarily. The hot die was used to evaporate the vehicle and leave the powder and the binder to be applied to the material upon which it was to be stamped, so whether the evaporation went from the paper or from the die I couldn't competently state.

Q. Well anyway the solvent evaporated, went out of the ink? A. That is right.

Q. The solvent was driven off by the heat? A. Yes.

Q. The ink worked pretty good in general, didn't it? A. For its purposes very well, yes.

Mr. Free: That is all.

Re-direct examination by Mr. Byerly:

Q. You never made or sold this ink for any purpose other than stamping, did you? A. No.

(996) Q. So that when you made this assignment of the patent rights, apart from stamping, you were not giving up anything that you had used, were you? A. No.

Q. You were somewhat surprised, were you not, to find that somebody wanted to buy those rights? A. Very much.

Q. Now looking at these prints, Defendant's Exhibit S-2, will you tell us just how those were stamped? A. You want me to tell you whether it is stamped or printed, or do you speak of both?

Q. How did you make those prints? A. We first printed on those that are marked with a filler, a size on onto the paper from the same die, and then we stamped on top of that to register the ink.

Q. Was the die heated? A. The die was heated.

Q. So it was just the same thing you did in stamping book bindings, except that first you printed this sizing over the surface of the paper; is that correct? A. Yes.

Mr. Byerly: That is all.

Re-cross examination by Mr. Free:

Q. The sizing was supposed to fill the pores of the paper, wasn't it? A. Yes.

Q. Otherwise the ink would sink down in and would not work well? A. That is right.

Q. When you sold these patents you had no idea that (997) they were valuable, did you? A. No idea.

Q. It looks like you and Professor Doughty started something in heat-set inks. Would you care to tell us how much you sold the patents for?

The Court: That is wholly immaterial.

Mr. Free: All right, that is all.

Mr. Byerly: That is all.

Milton W. Durham, called as a a witness on behalf of the plaintiff in rebuttal, being duly sworn, testified as follows:

Direct examination by Mr. Byerly:

Q. What is your business? A. Salesman, International Printing Ink Company.

Q. Here in New York? A. Yes.

Q. Did you ever do any work for International Printing Ink Company in the way of testing an ink invented by Mr. Jirousek? A. Yes.

Q. Just tell us what was done in that connection, what you did? A. Do you want the time I started?

Q. Yes, I would like to get the time of that as closely as we can. A. I was told in May of 1932 by my company to work with Mr. Sam Shearer and his associate in the development of the so-called Jirousek ink. We started development in the first week in June, 1932, and (998) I stayed with it every day, with the exception of two or three days probably, until December of 1932.

Q. Did Mr. Jirousek himself work with you during any part of this time? A. Yes.

Q. Have you any idea how much this work of yours in testing this ink cost the plaintiff corporation, how much money they put into that? A. I would say approximately $35,000.

Mr. Free: I do not think that is material, your Honor. Maybe they wasted the money.

Mr. Byerly: We did.

The Court: Strike it out.

Q. When did these tests end? A. In December, 1932.

Q. What success did you have with these tests?

Mr. Free: This man is a salesman. I do not think he is qualified to answer that question.

The Court: What kind of tests were they?

The Witness: These were tests that were run on the press. It was my job to make arrangements for the tests to be made, to secure the pressroom and paper, and go into the pressroom with the makers of the ink.

The Court: Objection overruled.

Q. Just tell us what happened at these tests, and what you finally decided to do about it? A. The first test, I remember, was at the Wilson H. Lee Company, New Haven, (999) Connecticut. It was a four-color job, run two colors, then dried and run the other two on top of the previous two. We made inks at our place of business at 45th Street. They

were taken up to New Haven and put on the presses of Wilson H. Lee. We first ran the first two colors with a gas burner, so-called ribbon burners, and we could not get the inks to dry so that they would not offset. Neither could we overcome the drying of the plates, drying on the rollers, and, as I said before, offsetting in the jogger. In the meantime Mr. Shearer thought he had insufficient heat, and he ordered put on the presses an electrical heater, which was four or five bars suspended over the jogger. After trying for several days to run the inks with this new heater we were not successful and abandoned the job. We then called in the International Printing Company, and they supplied the ink to finish the job, regular oil inks. That was test No. 1. Do you want any more?

Q. I do not know that you need to go into them more in detail, but you tested these inks on various sorts of commercial presses? A. We tested them on the Strawberry Hill Press. They dried on the rollers.

Mr. Free: He calls these Jirousek inks, but he has not told us what is in them.

Mr. Byerly: None of the testimony in Cleveland (1000) about these inks told us what was in them.

The Court: What evidence have you got of this Jirousek ink heretofore?

Mr. Free: I tried to put in some formulas giving the Jirousek ink, and that was stricken over objection. I am merely asking for the same here. He is talking about what he calls the Jirousek ink, and he does not know what it is.

The Court: What is the probative value of this?

Mr. Byerly: Your Honor admitted a considerable amount, practically everything in the depositions. There was not anything in the depositions that showed the composition of the ink, but your Honor said it is a heat-set ink and the depositions can go in. Now here is the identical——

The Court: They were proven to be heat-set inks, and I admitted them.

Mr. Free: Then the witnesses said they had run them on commercial magazines, and they worked fine. We were barred from discussing the formulas, quite properly so.

The Court: You can ask this man for the formulas of the inks that he ran, and then we will know what he is talking about.

Q. Tell us what you know about the formulas of the inks? A. I only know that our ink room at 45th Street (1001) supplied the so-called base inks, and Mr. Jirousek supplied his solvent and he mixed the two in the ink room. I never knew what was in the solvent.

Q. Did he refuse to disclose what was in the solvent that he mixed in as part of the ink? A. Yes.

Mr. Free: All this testimony, therefore, is incompetent, irrelevant and immaterial, because this man does not know what was in the inks.

Mr. Byerly: It is exactly on a par with the testimony taken in the depositions at Cleveland. All the witnesses said they did not know what was in the ink.

The Court: The sole important question about the inks is the solvent used. We have got a case where you are talking about an ink and we do not know what the solvent was, so its effect as a criterion of these other inks wholly fails.

Mr. Byerly: It seems to me the same thing is true of all these depositions that Mr. Free put in in Cleveland, because there was not a bit of proof as to the solvent. If those are stricken out——

The Court: If we made a mistake once we do not want to repeat it.

Mr. Free: At the time these depositions were let in the witnesses said this ink is one which is stable on the press, and when applied and heated it dries

(1002) instantly. This man says that the ink did not do that, and where does that leave us? There is no proof of any kind.

Mr. Byerly: I think your Honor should strike out all the proof in regard to this ink, as the solvent was not disclosed in the proof. The difficulty is that this so-called inventor, Mr. Jirousek, did not disclose the ink to any of the people.

The Court: You mean not disclosed in the patent?

Mr. Free: Yes. The patent is in evidence as one of our exhibits.

The Court: That is sufficient. Is this ink made according to the patent?

The Witness: I do not know, sir.

Mr. Byerly: The witnesses don't know that, because Mr. Jirousek——

The Court: The objection is sustained.

Mr. Byerly: May I very briefly offer to prove by this witness that the plaintiff company went to some expense in the year 1932 to thoroughly test the practicable usability of the ink invented by Jirousek as a heat-dried ink, and found it so unsuccessful that they gave it up. At the same time, your Honor, I should like, on the basis of your Honor's ruling, excluding this testimony, to move (1003) to strike all the depositions offered by the defendant in regard to an ink alleged to have been invented by Mr. Jirousek, because there is nowhere in that testimony any evidence whatever of the nature of the solvent used in that ink.

Mr. Free: May it please your Honor, the depositions were received and offered in strict conformance to plaintiff's *prima facie* case, where they only proved that our ink was stable on the presses and evaporated when heat was applied. It was on the basis that the Jirousek depositions were taken and received, because the witnesses said these inks worked fine on magazines. We printed them commercially. They

were stable on the press, and when heat was applied they dried quickly. This man says that the inks did not work at all, so that is the basis of my objection.

The Court: He did not say whether they were of the type of heat-dried inks or not. I will deny the motion and allow an exception.

Mr. Byerly: That is all.

(1004) ALBERT E. GESSLER, recalled as a witness by the plaintiff in rebuttal, having been previously sworn, testified further as follows:

Direct examination by Mr. Byerly:

Q. Dr. Gessler, when you were on the stand before you described the commercial heat-set inks sold by the plaintiff. Can you tell us now under what names those inks have been sold? A. They have been sold and are still sold under the name of Vaporin.

Q. When you were on the stand before, at pages 159 and 160 of the minutes, you stated that you kept a notebook of your work when you were the chief chemist of the Zinsser Company, and you started to point out how the notebook was arranged but the notebook was not put in evidence at that time. Is that your notebook? A. Yes, it is.

Mr. Byerly: I will ask that the notebook be marked Plaintiff's Exhibit 62 for identification.

(Marked Plaintiff's Exhibit 62 for identification.)

Q. You stated when you were on the stand before that the notebook was arranged by experiments which were given numbers, and under letters for branches of those experiments. A. That is correct; subdivisions.

Q. And that the pages were arranged by date; is that correct? A. That is correct.

(1005) Q. You also said when you testified before that in the year 1930 Mr. Cray of the Cray Printing Company asked you to produce an odorless ink for him, and that in making up an odorless ink——

The Court: Was not this part of your direct examination of him before?

Mr. Byerly: I am just picking up the point at which I was shut off before, at which it was objected that we were bringing out the date of his invention and that was not relevant.

The Court: The date of his invention?

Mr. Byerly: Right.

The Court: That is indicated on the patent, isn't it?

Mr. Byerly: It is before that. An inventor can always prove——

The Court: Does it show when he got the idea?

Mr. Byerly: Yes.

The Court: All right; go ahead.

Q. Now, in taking up this work did you consider a number of different solvents for use in odorless inks? A. Yes, I did.

Q. Can you point out where you listed those in your notebook? A. They were listed under the heading of Experiment 842-B, and I have listed a number of solvents. (1006) and I have listed them with their boiling points.

Q. Did you make up any inks with these solvents, and if so tell us how many inks you made up and what the solvents used in them were, and the dates at which you made them and what you did with them. A. Of the solvents listed in this list of solvents, I selected three solvents specifically. They were butyl cellosolve, carbitol and butyl carbitol, and I made a number of ink varnishes with these solvents using nitrocellulose as the binder or thickener, and I made according to this book six varnishes between the date of June 2nd and June 23rd.

Q. What year? A. 1930.

Q. Are the compositions of those varnishes in your notebook? A. Yes, they are.

Q. Did you make any of these varnishes into ink by adding pigment to them? A. Yes, I did. After having made a number of these varnishes, as I stated, six, I used these varnishes to make inks with them by mixing into the varnishes and dispersing in them pigments.

Q. In addition to the three solvents you referred to, in these inks did you use any plasticizers? A. Yes, I did.

Q. What did you use as plasticizers? A. I used dibutyl phthalate as a plasticizer.

Q. Just tell us under what heading or experiment in your notebook you have listed the compositions of these (1007) varnishes, ink varnishes, that you made? A. They are listed from Experiment 842B-1 through to B-6.

Q. Under what number did you list the composition of the inks which you made from these varnishes? A. They were listed under the heading of Experiment 842-C, from 1 to 10.

Q. What did you do with these inks? A. I sent these inks to the Cray-Finne Company.

Q. When did you do that? A. On the date they were made, or very very shortly afterwards.

The Court: What did you do with them?

The Witness: I sent them to the Cray-Finne Company.

Q. Is this written in German? A. Some of it. May I explain why?

Q. I wish you would explain to me what it means. A. It is more difficult to read a laboratory record in a foreign language than in English, and it is always an added protection, though it makes a perfectly good record.

Q. Did the Cray-Finne Company accept these inks as odorless inks and ask for more of them? A. Yes.

Q. How long did they work with them? A. These inks were started to be sent to Cray-Finne in June, and by July 28, 1930, I had sent them ten inks.

(1008) The Court: You said these were odorless inks that you tried to produce?

The Witness: Correct.

Q. Did you receive any complaints from the Cray-Finne Company in regard to these inks? A. Yes, they complained about the drying of the inks.

Q. Just what was the nature of their complaint? A. They found that when the inks were tried out on the printing press, that when they contained solvents whose volatility was low enough, that they did not dry on the rollers of the press, that they also did not dry very quickly on the paper; and if they were made of solvents whose volatility was higher, like, for instance, the solvents given here, butyl cellosolve or carbitol, then they dried faster on the paper, but they also started to dry on the rollers on the press.

Q. This you say was in the summer of 1930 you sent them these inks? A. Yes.

Q. And when was it you got these complaints? A. In the summer of 1930. I see here that this record is continued, this record 842-C, and inks were sent from July to September, 1930, to the Cray-Finne Company, inks all the way up to the number of 15.

Q. And that went up through September, you say? A. That went up through September, 1930.

(1009) Q. And then it stopped? A. Then we stopped the inks being sent to the Cray-Finne Company.

Q. I show you a letter dated February 17, 1932, which purports to be signed by you; is that a letter which you wrote and signed? A. Yes, I did.

Q. Will you refresh your recollection from that letter and tell us when you again sent any ink to the Cray-Finne Company? A. It says on February 17th that I have sent to the Cray-Finne Company a package containing a tin can

full of ink—no, I beg your pardon, a tin can full of dispersed pigment in the yellow, and a second tin can containing a special varnish "Made for you according to our original sample 842C-5."

Mr. Byerly: I will offer in evidence the letter referred to by the witness.

(Marked Plaintiff's Exhibit 63.)

Q. Had you received any communication from Mr. Cray between the time you stopped sending him these inks in 1930 and the time that you sent him the ink which is shown by this letter? A. Yes, I did.

Q. Just tell us about it. A. Mr. Cray—and I do not remember now was it Mr. Cray or Mr. Finne, I think it was Mr. Cray; it might have been both of them—came to Hastings on the Hudson, which was headquarters of Zinsser & Company who were my employers, and they told (1010) us, or they asked us to again take up this question of these inks that we had worked with them on in the year 1930.

Q. Did they give you any information as to what sort of inks they wanted, in addition to what they told you in 1930? A. Yes, they did. They wanted odorless inks, in the first place, and in the second place, Mr. Cray came out with the remark, or with the observation that he had seen heating units on printing presses, employed on printing presses during that time.

Mr. Free: That is hearsay, and, your Honor, I do not think Mr. Cray's remarks ought to go in at this time.

The Court: Strike it out as hearsay.

Mr. Byerly: If your Honor pleases, we are not trying to prove that they were used, but merely the data that was placed before——

The Court: It is hearsay testimony. He is stating what someone else told him.

Mr. Byerly: I respectfully except.

Q. Did Mr. Cray ask you to furnish him an ink which could be used on a press provided with a heater? A. Yes, he did.

Q. Was it in response to that request that you sent the ink referred to in this letter of February 17, 1932, (1011) Plaintiff's Exhibit 63? A. Yes, it was in direct response to that.

Q. Now will you please refer to your notes in connection with the formula given in the letter, and tell us what that ink that you sent in February, 1932, consisted of? A. The number of the ink, or the symbol of the ink mentioned in this letter is 842C-5. Looking at 842C-5 in this notebook, I find the date must be between June 24th and July 25, 1930, because it belongs in that series, and the ink 842C-4 bears the date June 24th, and ink 842C-7 bears the date of July 25th, so it must have been in that period.

Q. You mean that is when you first made it? A. That is when I first made it, in the year 1930.

The Court: When you first made what?

The Witness: When I made this ink the first time.

The Court: What ink?

The Witness: This ink that I had sent to Mr. Cray.

The Court: Not the odorless ink?

The Witness: Oh, yes.

Q. Was this ink which you sent to Mr. Cray on February 17, 1932, one of the same inks which you had previously submitted as an odorless ink in 1930? A. It was.

(1012) Q. Will you tell us the composition of that ink? A. The ink contained—842C-5—contained 10 parts of dispersed pigment and 7½ parts of varnish 842B-5. Varnish 842B-5, under date June 23, 1930, consisted of 70 per cent butyl carbitol, 30 per cent dibutyl phthalate, and 60 per cent nitrocellulose ¼ second.

Q. Was this one of the inks that Mr. Cray had rejected in 1930? A. It was.

Q. Now why, when he asked you for an ink to be used on a press provided with a heater, did you send him this ink with the butyl carbitol solvent? A. During the time when Mr. Cray had lost his interest for this work, namely, from the end of 1930 to the beginning of 1932, I naturally had not lost my interest in those inks, and I had continued experimenting with them, though not with as much pressure as before, and a number of very important points had formed in my mind concerning these inks, so that when Mr. Cray came out with the request for an ink that can be used on a heated press it instantly occurred to me at that time that these points now came together and made a complete story, a complete solution of the problem.

Q. What were these things that you had been thinking of; I mean how did it happen that your mind hit upon an ink with the butyl carbitol when he told you that he (1013) wanted an ink for heating on a press? A. I would say that four points or observations came together in my mind and formed a recognition at that moment. The first one was that I remember very distinctly how it had been established in the year 1930 in my experiments with Mr. Cray that butyl carbitol as a solvent was the only one that would not evaporate on the rollers and would remain moist on the rollers. I therefore concluded that an ink containing a solvent evaporating faster than butyl carbitol would not be fit to be printed on typographic equipment. As you remember, I had in that time, in 1930 I had inks made of butyl cellosolve, carbitol and butyl carbitol, and as we worked with those inks in the year 1930 Mr. Cray, Mr. Finne and myself—that is supported by entries in this book here—we found that the ink containing butyl cellosolve dried much too fast on the rollers; that ink containing carbitol still dried on the rollers, but that ink containing butyl carbitol did not dry on the rollers. So I knew that I must send an ink to Mr. Cray that had a solvent that would not evaporate faster than butyl carbitol. That was point No. 1.

Point No. 2: During the time when I had not worked with Mr. Cray I had tried to use these inks for printing inks, and had made a number of experiments at that period, applying these inks to tin, as it is printed (1014) on tin cans, and heating them in an electric oven, and in this notebook here you find experiments referring to that. I had noticed in these experiments, trying these inks in an electrical oven, that the evaporation rate increased very fast upon rise of temperature, and I had noticed that butyl carbitol evaporated with great ease in an electric oven from a film on a tin plate.

The third point that I had recognized that I had already suspicioned, perhaps in the year 1930, and that had become extremely clear to me in the meantime, was that I was dealing with extremely thin films. I was not dealing with beakers, with barrels full of material. I was dealing with extremely thin films. I had gained the knowledge that a film of printing ink on a paper is of the thickness of something like 3 to 5 microns. For comparison let me say that 25 microns is a thousandth of an inch, and is about the thickness of the cellophane that is used for wrapping up cigarettes. I knew that printing ink film was very very much thinner than this, than, for instance, the cellophane that is used for wrapping, and I knew and had learned that a solvent contained in such a film would evaporate extremely fast, because obviously very little solvent is in such a film, and it is exposed over a very large surface. I had realized fully that it would not be necessary to heat the (1015) solvent to the boiling point of it, that that was not necessary at all; that a comparatively moderate rise in temperature was enough to drive it off.

Those were the three points I was fully conversant with. The reason my inks in the year 1930 were not a success was that I was constantly trying to find the fine balance between not drying on the rollers and not drying on the paper, or vice versa. And now, when Mr. Cray came, in the year 1932, and told me that heating units,

steam-heated rollers are used on printing presses, that was the last key that I needed for the solution of the problem. I had not known that before, and I knew that if I could apply any heat to the thin film of those inks that they would dry almost instantaneously. With that in mind that was the mental background, I would say, that I sent this particular ink to Mr. Cray. I did not send him a number of inks or a selection of inks, but I sent him just one specific ink.

Q. Dr. Gessler, you have referred to the butyl cellosolve and carbitol, that is, inks containing those, as drying too fast and not staying on the rollers of the press properly. Can you point to anything in your notebook referring to that? A. I think I can. I find an experiment here, experiment 842C-2, which was an ink made of pigment and a varnish made from varnish with the (1016) number 842B-2, which consisted of 100 parts butyl cellosolve and 70 parts nitrocellulose. This experiment refers to this varnish 842B-2, and the remark that this ink dries too fast, the remark is made that this experiment was it dries too fast.

Q. That particular note was written in German? A. That particular note was written in German.

Q. What do you find about the ink which you made from carbitol, which I think you find was experiment 842C-11? A. That is right. That experiment was an ink made of the same pigment as before, and a varnish 842B-4, which consisted of 100 parts of carbitol and 60 parts of nitrocellulose. The remark is that that experiment, whose date is July 31, 1930, says sample sent to Mr. Finne, carbitol used as thinner, and then result no good. Then comes a German remark. The quotation in English is that it would not remain on the plate, that it would not remain on the plate. That is experiment 842C-11.

(1017) Q. Now I call your attention to Defendant's Exhibit G, and contained therein is a 1929 circular or catalog of the Carbide & Carbon Chemicals Corporation. I call your attention to the page giving data as to their various

products. According to this data published by the manufacturer how does the vapor pressure at room temperature compare, that is, the carbitol which you found was unsuccessful to the butyl carbitol which you found satisfactory? A. In this list the vapor pressure of carbitol at 20 degrees Centigrade is listed as .13 millimeters. The vapor pressure of butyl carbitol is listed at 20 degrees Centigrade as .05 millimeters.

Q. That is, carbitol, according to that, has a vapor pressure of twice that? A. Carbitol has a vapor pressure of 2½ times as high, roughly, of butyl carbitol.

Q. I notice you did not use those particular vapor pressure figures in your patent. Why was that? A. The reason is that the Carbide—I got my vapor pressure figures from the Carbide & Carbon Chemicals Company. They first listed the vapor pressure of butyl carbitol which was the one that interested me, specifically at room temperature as .05 millimeters, as I have just stated. In later use of the same catalog they listed (1018) that vapor pressure as smaller than .1 millimeter, and much later, before the patent was issued finally, the Brewer and Gardner article came out which listed the vapor pressure of butyl carbitol as .02 millimeters, but it became quite apparent from this that this vapor pressure data at this low temperature of 20 degrees Centigrade was changed with the method of determination, and that different observers arrived at different values. May I add to it?

Q. Go ahead, surely. A. It was not really important to state the vapor pressure of butyl carbitol in numerical figures as long as it was stated that that was the desirable vapor pressure.

Q. Now, after you sent this butyl carbitol ink to the Cray-Finne Company in February, 1932, did you make any tests or learn of any tests being made to ascertain whether you were correct in thinking— A. Yes.

Q. —that this ink would dry instantly on the paper with a slight amount of heat? A. Yes. I instantly equipped

my laboratory with a steam-heated cylinder, not rotating, just standing still, and all prints of these inks that I wanted to test were passed around the steam-heated cylinder. I was able to give different steam pressures to the cylinder, thereby attaining different temperatures.

(1019) Q. Did you then make any record of what you conceived to be your invention? A. Yes. I was of the belief then, I was impressed that instead of making an odorless ink I had made an invention of a quick-drying ink, and I instantly, or not instantly, within a very short time, sat down to write down a disclosure of what I knew at that time of this particular kind of ink.

Q. I show you a paper apparently signed by you. Can you tell us what that is (handing to witness)? A. It is signed by me. It is a disclosure of this invention dated April 4, 1932, signed by myself and notarized.

Mr. Byerly: I offer this paper in evidence as Plaintiff's Exhibit 64.

(Marked Plaintiff's Exhibit 64.)

Mr. Free: Do you want to exclude this notarial seal at the bottom? Or does that go in?

Mr. Byerly: Let me see the original.

The Witness: I don't know whether it was notarized. It was countersigned.

The Court: We will take a recess for ten minutes.

(Short recess.)

Q. In Plaintiff's Exhibit 64, your disclosure of this invention, you refer to the rapid evaporation of the film (1020) of your ink when it is heated, do you not? A. Yes.

Q. I notice at the top—perhaps you might point out where you refer to that. A. I remember I referred a number of times to the vaporation of a thin film.

Q. When heated? A. That is right. For instance in paragraph 3 it says, "will dry quick enough if exposed to

heat after being printed, by the evaporation of the solvents out of the very thin layer, leaving a very flexible film."

Then in the second last paragraph, the second last line there it says, "but yet drying out from the thin film of the print within a few seconds if exposed to heat, as for instance, by passing over a steam-heated roller."

And in the very last line of that page it says, "out of the thin layer of the print if exposed to heat for a short time."

Q. I notice that this statement of yours, Plaintiff's Exhibit 64, has at the top of it these words, "Amendment to description of July 8, 1930." A. That is correct.

Q. After you had written out this description, Plaintiff's Exhibit 64, did you take the matter up with the patent attorney for your company, the Zinsser Company? A. Yes, I did, very shortly afterwards.

The Court: Whom were you working for then?

(1021) The Witness: For Zinsser & Company, Hastings-on-Hudson.

Q. Is this paper I now show you the description of July 8, 1930, which is referred to at the top of Plaintiff's Exhibit 64 (handing to witness)? A. Yes, it is.

Q. Is there any reference to heating the ink in this description of July 8, 1930? A. No.

Mr. Byerly: I will offer this description of July 8, 1930, as Plaintiff's Exhibit 65.

Mr. Free: I object to it, your Honor. There is no reference to heat in it. It does not add anything to the disclosure of April 4, 1932.

Mr. Byerly: I offer it, your Honor, solely for the purpose of explaining the note at the head of the other paper.

The Court: Objection overruled.

(Marked Plaintiff's Exhibit 65.)

The Court: Where is the date of the notary?

The Witness: Right on the bottom, and here it is notarized (indicating).

The Court: Which one says anything about heat?

The Witness: This one here.

The Court: Where?

The Witness: Right there (indicating), and a (1022) few more times it speaks about it.

Q. You indicated on Plaintiff's Exhibit 64 to the Court as referring to the ink. A. I did.

The Court: You did not state in here what your solvent was, did you?

The Witness: Yes, I did.

The Court: Where? You speak of the characteristics but you did not name butyl carbitol.

The Witness: I did. In the example the solvent, diethylene glycol butyl ether, is mentioned, which is the scientific name for butyl carbitol, which is a trade name.

Q. After you had written the first of these two descriptions, which has been marked Plaintiff's Exhibit 65, on July 8, 1930, did you take steps to apply for a patent? A. I did not get your question.

Q. (Read.) A. Yes—not after the first one; the second one. I took no steps after the first one.

Q. Now you were with Zinsser & Company at the time you wrote out these statements, is that correct? A. That is correct.

Q. When did you first come in contact with the plaintiff, the Interchemical Corporation, formerly called the International Printing Ink Corporation? A. It happened that in the Fall of 1933 there was a luncheon date between (1023) Mr. Goldthwaite, at the time president of the International Printing Ink Corporation, and Dr. Zinsser, president of the Zinsser Company, to which luncheon I was invited.

Q. I show you a letter dated November 22, 1933, which purports to be signed by F. G. Zinsser. Can you recognize that signature (handing to witness)? A. Oh, yes. The signature of F. G. Zinsser, who was president of the Zinsser Company at that time.

Q. And that letter is written to Mr. Goldthwaite, president of the International Printing Ink Corporation? A. That is correct, on November 22, 1933.

Q. From that letter can you fix the approximate date of the luncheon which you attended with Dr. Zinsser and Mr. Goldthwaite?

Mr. Free: I think it is immaterial, your Honor. It is after the date of the patent in suit and I do not see what connection it has.

The Court: What does this prove? The patent was granted. That has not been attacked.

Mr. Byerly: I am simply explaining how the patent got into the hands of plaintiff. I do not know that it is very vital——

The Court: Got into the hands of the plaintiff?

Mr. Byerly: Yes.

The Court: Well, he assigned it to them.

(1024) Mr. Free: Yes. I stipulated that they owned it.

Mr. Byerly: It was assigned first to Zinsser——

The Court: Well, no question was raised as to the way in which it was assigned.

Mr. Free: No.

The Court: We can assume that it was properly assigned and came into their hands by lawful conveyance.

Mr. Byerly: Do I understand that the objection is sustained?

The Court: No. I am just suggesting that you are trying to prove something that is not necessary to prove.

Mr. Byerly: I am merely trying to prove how this gentleman became associated with the plaintiff. It will take about two questions. That will tie it up.

The Court: All right, let us hurry along.

Q. From that letter can you fix the approximate date of the luncheon to which you referred? A. Yes. The date was the 27th or 28th of November, 1933.

Q. At that luncheon did you tell Mr. Goldthwaite of your invention and of the use of your printing ink at the Curtis?

The Court: Did you later assign your rights? To whom?

(1025) The Witness: Well, my rights were originally assigned to the Zinsser Company.

The Court: That is what you want to prove?

Mr. Byerly: Yes.

Q. You assigned your rights to the Zinsser Company? A. I assigned my rights to the Zinsser Company.

Q. At the time you applied for your patent? A. At the time of the application, correct.

Q. Were you employed by the International Printing Ink Corporation as head of their research department soon after this luncheon at which you explained your invention and its use to Mr. Goldthwaite? A. Yes, in the beginning of 1934.

Q. Did you urge him to purchase your application? A. I did.

The Court: We have gone into that. It has been purchased and assigned.

Mr. Byerly: Yes. That concludes that line entirely, your Honor.

Q. Did you disclose to the Carbide & Carbon Chemicals Corporation the fact that you had invented an ink in which the solvent, butyl carbitol, made by them might be used?

A. Yes, I did. I disclosed it to Mr. Davis, vice-president of the company, Dr. Davis.

Mr. Free: What is the question?

(1026) Q. (Read.) A. May I add to that——

Mr. Free: I still object to that. I do not see what is the materiality of that. This company, Carbide & Carbon Chemicals Corporation is not a party here.

The Court: It makes no difference. It is already in.

Q. I show you the catalogs of the Carbide & Carbon Chemicals Corporation beginning with the Third Edition in April 1930, the Fourth Edition May 1931, the Fifth Edition March 1933, the Sixth Edition August 15, 1934, and the Seventh Edition March 1, 1935. Will you please tell us whether any of these Carbide & Carbon Chemicals Corporation catalogs from 1930 to 1935 refer to the use of butyl carbitol in printing ink?

Mr. Free: Well again, your Honor, that is immaterial.

The Court: I do not see the materiality of that. They are not a party to the suit. Whether the catalog mentions it or not makes no difference.

Mr. Byerly: I think they brought in an early catalog and showed that—or rather they implied—well, the letter to Cray-Finne did not get in, did it?

Mr. Free: No, you kept that out.

Mr. Byerly: I will abide by your Honor's ruling on it.

(1027) The Court: I will sustain the objection.

Q. I call your attention to an advertisement of the Carbide & Carbon Chemicals Corporation forming part of Defendant's Exhibit G, which mentions butyl carbitol as among

a considerable number of other solvents. In that advertisement I find the words "Dye solvents in printing and vat dyeing."

The Court: What is that?

The Witness: "Dye solvents"—these solvents here (indicating)—"in printing and vat dyeing."

Q. Can you tell us what that expression means? Are you familiar with the trade use? A. Yes. I am fully familiar with the use. That refers to textile printing. Textiles are printed by solution of dyestuffs in water or solvents.

The Court: What has that got to do with this lawsuit?

Mr. Byerly: We think it has nothing to do with it, your Honor, but the defendant put it in evidence and we would like to show that.

The Court: Oh, the defendant put that in evidence?

Mr. Byerly: Yes, the defendant put it in evidence.

A. (Continuing) So butyl carbitol and the other solvents mentioned here are mentioned as being solvents (1028) for dyes in printing, and it is very obvious that it means textile printing because right afterward it says "and vat dyeing"—vats have a certain class of dyes.

Mr. Byerly: In view of that, your Honor, I should like to bring out the fact that butyl carbitol in the catalog of this corporation is not mentioned in connection with printing—merely to meet that.

The Court: All right.

Q. Now I show you these catalogs from 1930 to 1935 of the Carbide & Carbon Chemicals Corporation, each of which contains a description of butyl carbitol. Will you

please point out whether or not any one of those refers to printing ink in connection with uses of butyl carbitol?

Mr. Free: The same objection as before, your Honor. These were ruled out as not having any probative value here. They are catalogs of some other company.

The Court: Were they ruled out before?

Mr. Free: Yes.

The Court: Did you offer them?

Mr. Free: No, Mr. Byerly offered them once before.

The Court: Then I will sustain the objection.

Mr. Byerly: Your Honor, I think they have a bearing on this advertisement——

(1029) The Court: It may have a bearing but it is really of no probative value. You are making a record here that is getting a little ridiculous, all these little points.

Mr. Byerly: Your Honor, I will ask to have catalogs identified and I will offer to place them in evidence later.

(Marked Plaintiff's Exhibit 66 for identification.)

Q. Have you read over the minutes of the testimony which you gave in this case? A. Yes, I did.

Q. I call your attention to page 184 where the question is given as—this is on cross examination—"The lower vapor pressure solvent dries much slower, doesn't it? A. It dries much slower, that is correct." Did you make that statement? A. No, I don't think I said it.

The Court: What did you say?

The Witness: It dries slower.

The Court: Strike out the word "much" there.

Q. In another place where there is a date wrong——

Mr. Byerly: Well, I think I can fix that with my brother.

The Court: Correct that. We will take your word for it.

Q. Oh, the only other thing—you said in your former (1030) deposition was that you sold both butyl carbitol varnishes and butyl carbitol acetate varnishes to the Manufacturers Printing Ink Company? A. Yes.

Q. Have you checked your records on that? A. I did.

Q. What did you find? A. I find we did not sell them butyl carbitol acetate varnishes but only butyl carbitol carbitol varnishes. That was a mistake.

Mr. Byerly: That is all.

Cross examination by Mr. Free:

Q. I understand, Dr. Gessler, you tried different solvents when you were experimenting with these varnishes? A. I did.

Q. And you name butyl cellosolve, carbitol, and butyl carbitol? A. That is correct.

Q. You tried more than that? A. No, I did not. I tried a number of them.

Q. Half a dozen or ten or so? A. According to these records, I have only records of those three.

Q. What is your recollection? A. Well, as you see from the list given I considered a number of them but out of this list I selected only those three.

Q. Yes. You tried one after another until you found what you wanted? A. No, I don't think so at all.

Q. What did you do? A. I selected from this list those three that I thought would answer this question.

(1031) Mr. Byerly: Oh, your Honor, I forgot to offer this notebook in evidence. I think perhaps before Mr. Free goes further I had better do so.

The Court: All right.

Mr. Byerly: I offer that part of the notebook containing the experiments referred to by the witness.

The Court: It will be admitted.

(Marked Plaintiff's Exhibit 62.)

Q. What I want to get straight in my mind, Dr. Gessler, is this: You selected these three, is that right? A. That is right.

Q. Did you select them from a much longer list? A. That is right.

Q. And before you selected them you tried them all out, did you? A. No. You see the list is listed according to the boiling point, and if you followed on I took it from a certain boiling point on upwards.

Q. Oh, I see. You took them out of a long list in accordance with their boiling point? A. That is correct. That was my first indication of evaporation rate.

Q. And you tried butyl cellosolve and that did not work so well, is that right? A. I stated that in one of the experiments.

Q. Yes, and you tried carbitol and it did not work so well? A. That is right.

(1032) Q. And finally you hit on butyl carbitol? A. Yes, I used butyl carbitol.

Q. Now this property of butyl carbitol, of low vapor pressure at room temperature and rapid evaporation when heated, say, above 100 degrees, is a property of the stuff itself, isn't it? A. Yes, it is a characteristic.

Q. Inherent in the butyl carbitol? A. Inherent in the butyl caribtol and perhaps similar other solvents.

Q. It is also inherent in diethylene glycol, isn't it, that same property? A. It is.

Q. And maybe a couple of other ones? A. Maybe some others.

Q. Did I understand you to say on your *prima facie* case before that you did not think diethylene glycol was a good substance for making an ink out of? A. Yes. I said so and I gave the reason why.

Q. In going down the list of solvents in the catalog of Carbide & Carbon Chemicals Corporation you did not select the diethylene glycol? A. You mean I did not see it or what?

Q. Did you see it on a list? A. I knew it. I was familiar with diethylene glycol anyway.

Q. But you did not pick that as one that was useful? A. No.

Q. Why didn't you? A. Because I knew how hygro- (1033) scopical it was.

Q. Did that Carbide & Carbon Chemicals' catalog— A. May I tell you why I knew that?

Q. Yes. A. It happened for years before that I had been working on the dispersion of pigments by means other than mechanical means—chemical means. The idea was to disperse pigments in varnishes for printing inks or for lacquers without mechanical grinding, and for years I had gone through that. I had also applied those dispersed pigments with nitrocellulose—and you will find that in my records—to textiles, and I found that no inks containing nitrocellulose and diethylene glycol were stable. I could prove that very easily.

Q. I will take your word for it. In selecting these three solvents that you referred to, butyl cellosolve, carbitol and butyl carbitol, did you have reference to a Carbide & Carbon Chemicals Corporation catalog? A. I knew them. I don't know if I had reference, but I knew naturally those solvents.

Q. You may have referred to a catalog? A. I may have, certainly. I most probably had the catalog.

Q. You got copies of their catalogs, did you? A. Oh, yes.

Q. Do you recognize the catalog that you might have seen as this one, January 1929 (handing to witness)? (1034)

A. It might have been, I don't remember. I think there is a later one—well no, in the year 1930. That was most probably the catalog I referred to if I referred to any. That is pretty obvious.

Q. As a matter of fact it was published January 1, 1929? A. And the next one—may I ask when the next one was published?

Q. I will tell you. (Examining.) April 15, 1930. I will show you that catalog (handing to witness). A. Well, that might have come up in there, too, because that was right in that period. It is even probable that I used the 1930 one because that was published just before I started my experiments. Most probably I had the latest catalog. That is possible. However, I cannot tell.

Q. On the fly-leaf of the Carbide & Carbon catalog there is a list of their products. Do you remember that list (handing to witness)? A. A similar list.

Q. That gives boiling points and vapor pressures? A. It does.

Q. And you may have selected these three solvents that we are talking about from that list? A. That is possible, although I knew the solvents. I was very conversant with them. I told you a while ago why.

Mr. Free: I offer in evidence as Defendant's (1035) Exhibit U-2 the 1930 catalog referred to by the witness.

(Marked Defendant's Exhibit U-2.)

Q. As I remember, when you experimented with heat after you received that letter from Mr. Finne on February 17, 1932, you had a steam cylinder? A. That is right.

Q. And you tried different temperatures? A. That is right, different temperatures.

Q. And finally hit upon the temperature which would work on butyl carbitol, is that right? A. Well, you see

there are two elements coming in the drying of an ink film, and that is the time of contact and the temperature. They are naturally very closely related.

Q. You got that by experimenting, did you? A. Yes, certainly.

Q. Now will you refer to your Exhibit 65, the July 8, 1930 disclosure. In the middle of the third paragraph you talk about an ink. A. Yes.

Q. Which "does not harden or thicken on the printing rollers." A. That is right.

Q. "but notwithstanding this, will dry quick enough if exposed to heat after being printed, by the evaporation of the solvents out of the very thin layer." How long would that take without heat? A. I think I have a (1036) sentence in this—if I may just read through that, the first part of that.

Q. Yes, please do. A. It says here in the next paragraph, paragraph 4, the last two lines, "but yet are volatile enough to evaporate quickly from the thin film of the print if exposed to heat for a short time"—if spread in a thin film of printing.

Q. And down near the end of the second last paragraph it states, "but drying on paper within an hour." Is that the measurement of the time of drying that you had in mind? A. Where do you find that, may I ask?

Q. Down here (indicating). A. Oh, yes, "drying on paper within an hour." Evidently that is right.

Q. Now in referring to this Carbide & Carbon catalog entitled "Custom-built solvents"—this is an advertisement, rather, dated April 1931—you did not mean to give us the impression, did you, that your ink was not appropriate for printing on textiles? A. It says here "as a dye solvent." There is no dye in my ink, and it is not a solvent for a dye.

Q. In line 35 of the first column of page 2 of your patent in suit you include "dyestuffs" in the list of those that you want to use. A. Yes.

Q. It says, "yellow pigments may be replaced by any (1037) suitable pigments or dyestuffs." A. Yes.

Q. Is that any different from the dye that you referred to a while ago in this Carbide & Carbon Chemicals Company advertisement of April 1931? A. Well, does that paragraph refer to textile printing? Because that is very obviously textile printing.

Mr. Byerly: I think the witness should have a copy of the patent if he is going to be questioned about it.

Mr. Free: Well, I am showing it to him.

Q. Here (indicating). A. I see it.

Q. Your patent does refer to textiles in line 37 of the second column of page 2? A. Does it refer to "with dyes"?

Q. "Very satisfactory prints upon many other surfaces, such as for instance textiles or metallic surfaces," and so on. A. But it does not say that it would be dyes on textiles, does it?

Q. You say here in line 35 of the first column of page 2 that you can use dyestuffs, do you not? A. You see, it says—may I explain that to you? It says here, "suitable pigments or dyestuffs and/or mixtures thereof." I made some of these inks from black inks—we used some black dye to reinforce our pigment in small quantities.

Q. Oh, this reference to "dyestuffs" has to refer only (1038) to black inks, is that what you mean? A. Well, that is the only way that we used it.

Q. These dyes referred to in "Industrial Engineering Chemistry, April 1931" are also dyestuffs, are they not? A. They are also dyestuffs.

Q. And dyestuffs mentioned in your patent you also have used on printing of textiles, as you say; isn't that so? A. Yes—well, it may, but I don't know.

Q. You don't know what you meant in your patent? A. No, no. I say I never tried dyestuff ink of that nature on textiles.

Q. So you never tried printing with your ink on textiles? A. Yes, but while it contained pigment, not dyes.

Q. So you distinguish between pigments and dyestuffs? A. Certainly.

Q. How does it differ between a pigment ink and a dyestuff ink? A. Well, a pigment stuff is not soluble. Dyestuff is soluble, like sugar in water, but sand is not soluble in water.

Q. When you have a dyestuff ink you have a thin ink, don't you? A. Not necessarily.

Q. What gives you the body of the dyestuff ink? A. Any kind of a thickener.

Q. For example? A. For instance,—you mean in (1039) ordinary textile printing?

Q. Take the ink that you have reference to in the patent in suit. A. Well, the nitrocellulose would be a thickener.

Q. That is an ink made up with the dyestuff in it, as I understand it, nitrocellulose and dye, that you just described, is that right? A. That could be an ink like that.

Q. And that can be used for printing on textiles as well as on paper? A. You asked me that before and I said I do not know.

Q. You never tried it? A. No, I only tried pigment inks.

Q. Some of these other solvents that we referred to in this Carbide & Carbon catalog, like diethylene glycol, they also have a narrow boiling range? A. Oh, yes.

Q. That is characteristic of the glycol ethers? A. Characteristic of any pure chemical compound.

Mr. Free: That is all.

Mr. Byerly: That is all.

(Adjourned to January 27, 1943, 10:30 a. m.)

(1040) New York, January 27, 1943;

10:30 o'clock a. m.

TRIAL RESUMED.

Mr. Byerly: If your Honor pleases, I had two more witnesses on my rebuttal and both of them have fallen sick during the case, but I think I would like to tell you about one of them. He lives in Haddonville, New Jersey, which is near Philadelphia. He was supposed to be here yesterday afternoon. He telephoned me yesterday morning that he was sick in bed with a fever. I sent an employee of my office over to check on the situation and found that he had a cold on his chest and his doctor told him he could not go out yesterday, and I telephoned him this morning and he said he was feeling better and that he can be here by two o'clock this afternoon. The testimony won't take more than, I presume, half to three-quarters of an hour, and I would like to ask your Honor's indulgence to continue until two o'clock for this witness. I think that will not prevent us from summing up this morning.

The Court: Is there any objection?

Mr. Free: Yes, I do not see how we can sum (1041) up completely unless we have all the testimony in.

The Court: What would this witness testify to?

Mr. Byerly: This witness will testify as to the state of the art. In Exhibit G Mr. Free has put in, as bearing on the state of the art, a magazine article written by Milton E. Hanson. I propose to call Mr. Hanson to show much more fully than this article does the state of the art,

The Court: Is that the article?

Colloquy of Counsel.

Mr. Free: That is the article, yes. (Handing to Court.)

The Court: The author of this you want to call?

Mr. Byerly: That is right. I think your Honor understands in these patent cases the state of the art is a very vital thing, that is, what knowledge there was at the time of the invention.

Mr. Free: That publication speaks for itself. It is a publication in December, 1931. You cannot change it.

The Court: He does not repudiate it, does he?

Mr. Byerly: He will explain it and give a much clearer view of the art. Of course, part of my rebuttal is to show what the state of the art was. No, he won't (1042) repudiate the fact that he wrote it, certainly.

The Court: Is this witness under subpoena?

Mr. Byerly: Yes.

The Court: I do not think I can continue the case. I have given notice here two or three times that it could not be delayed. Unless you have got another witness ready now, I think we had better close the testimony.

Mr. Byerly: Will your Honor grant an exception on that ruling?

The Court: Yes.

Mr. Byerly: I have one other witness, who is in a somewhat more serious situation, a witness by the name of Decou, who is an employee of the plaintiff in Chicago. Before the trial started arrangements were made to have him here at the trial and he then had to go to the hospital for an operation, and I have here an affidavit of his physician.

The Court: He does not say when he can be here?

Mr. Byerly: He says that he cannot make the trip to New York before the 1st of March.

The Court: Well, we cannot count on him.

Mr. Byerly: This witness testified in an interference proceeding, to which some reference has (1043) been made, and what I wish to get from him was testimony along the line of that which he has already given, and as part of my motion for this continuance I would like to present to your Honor a transcript of what he said in the other case.

Mr. Free: I object to that. We were not a party to this interference. We had no right to cross examine him. We never saw him.

The Court: The objection is sustained.

Mr. Byerly: I respectfully except to your Honor's ruling.

The Court: All this testimony you refer to is more or less cumulative, isn't it?

Mr. Byerly: I think that is true of the witness who was to be here this afternoon, that is, his testimony is not cumulative but bears on the state of the art.

The Court: He is just going to testify and explain the article that was in a publication that is in evidence, isn't that it?

Mr. Byerly: He is going to tell his personal experience in endeavoring to get this sort of an ink at the time he wrote his article. His article indicates the type of ink he wanted, but not the kind of ink he had, and he tried to get it and to make it and was unable to do so. I think that is relevant on the question of the (1044) scope of the invention showing what was the knowledge in the state of the art.

The Court: I think we had better close the testimony and proceed with the motions by counsel.

You may now go ahead and sum up.

Mr. Byerly: Shall I proceed first, your Honor?

Mr. Free: Have you closed your case?

Mr. Byerly: The Court closed it.

Colloquy of Counsel.

Mr. Free: I want to make a motion, your Honor, to strike the testimony of Messrs. Hurley, Busby, Dennerlein, Joy and Hecker, all having to do with this alleged commercial success because the ink which was used by these people was not described by them, they knew nothing at all about it. I asked each of them on cross examination what was in the ink, they did not know. There has been no connection, therefore, between the ink which these people used on their presses and the patent in suit, and it has no connection with this case whatsoever. It does not belong in the case and I think that testimony ought to be stricken for that reason, and I so move.

The Court: I will deny the motion.

Mr. Byerly: Shall I proceed now, your Honor?

The Court: Yes.

CLERK'S COPY.

Supreme Court of the United States

OCTOBER TERM, 1944

No. 556

SINCLAIR & CARBOLL COMPANY, INC.,
PETITIONER,

vs.

INTERCHEMICAL CORPORATION

ON WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SECOND CIRCUIT

United States Circuit Court of Appeals

FOR THE SECOND CIRCUIT.

INTERCHEMICAL CORPORATION,

Plaintiff-Appellant,

v.

SINCLAIR & CARROLL CO., INC.,

Defendant-Appellee.

On Appeal from the United States District Court
for the Southern District of New York.

TRANSCRIPT OF RECORD.

ROBERT W. BYERLY and
RALPH M. WATSON,
New York, N. Y.
Counsel for Plaintiff-Appellant.

HOGUET, NEARY & CAMPBELL,
WALTER H. FREE and
JOHN F. NEARY, Jr.,
New York, N. Y.
Counsel for Defendant-Appellee.

INDEX.*

	PAGE
Prefatory Statement	1
Complaint	2
Answer	4
Amendment to Answer	9
Plaintiff's Bill of Particulars	11
Defendant's Bill of Particulars	13
PLAINTIFF'S WITNESSES.	
Charles R. Bragdon:	
Direct	25
Cross	55
Re-direct	63
Re-cross	63
Re-direct	64
Frank W. Cray:	
Direct	65
Cross	88
Re-direct	99
Re-cross	101
William A. Magie (deposition):	
Direct	103
Cross	103
John Krawetz (deposition):	
Direct	105
Re-direct	106
Re-cross	107

* A complete Index printed in each volume.

	PAGE
Albert E. Gessler:	
Direct	108
Cross	119
Re-direct	130
Re-cross	140
Calvin Detrick:	
Direct	146
Martin J. Hurley:	
Direct	147
Cross	157
Re-direct	162
Re-cross	163
Calvin Detrick (recalled):	
Direct	163
Cross	167
Gilbert W. Stratton (deposition):	
Direct	170
Cross	172
Re-direct	175
Re-cross	175
James M. Alden (stipulated):	
Direct	176
Paul O. Blackmore:	
Direct	177
Cross	183
Ralph A. Hayward (deposition):	
Direct	185
Cross	201
Re-direct	206
Re-cross	207
Francis J. Jeuck:	
Direct	209
Cross	225
Herbert F. Smith:	
Direct	229
Cross	234

PAGE

Peter Dennerlein (deposition):
Direct 235
Cross 238
Re-direct 238

REBUTTAL PROOFS.

Edward R. Busby (deposition):
Direct 583
Cross 602

Leonard R. Hecker (deposition):
Direct 609
Cross 614
Re-direct 621
Re-cross 621

Edmond P. Joy (deposition):
Direct 622
Cross 629

Peter Dennerlein (deposition):
Direct 634

Charles R. Bragdon:
Direct 640
Cross 671
Re-direct 682
Re-cross 688

Sidney Satenstein:
Direct 688
Cross 692
Re-direct 695
Re-cross 696

Milton W. Durham:
Direct 696

Albert E. Gessler:
Direct 701
Cross 719

DEFENDANT'S WITNESSES.

	PAGE
Clinton Taylor:	
Direct	247
Cross	326
Re-direct	382
Re-cross	388
Re-direct	393
Re-cross	394
William A. Magie (deposition):	
Direct	396
Cross	399
Re-direct	400
John Krawetz (deposition):	
Direct	401
Cross	405
Re-direct	408
Re-cross	409
Edward Beres (deposition):	
Direct	410
Cross	418
Re-direct	421
Re-cross	422
Charles J. Theuer (deposition):	
Direct	422
Cross	432
Re-direct	435
Re-cross	440
Re-direct	440
Lewis E. Nichols (deposition):	
Direct	441
Cross	460
Re-direct	465

PAGE

Clayton H. Benjamin (deposition):
Direct 465
Cross 475
Re-direct 476

Frank Pellinger (deposition):
Direct 477
Cross 491
Re-direct 498

Peter Dennerlein (deposition):
Direct 501
Cross 501
Re-direct 509
Re-cross 509

Roy Carroll:
Direct 510
Cross 531
Re-direct 542

Raymond A. Kerley:
Direct 545
Cross 558
Re-direct 569
Re-cross 571

Clinton Taylor (recalled):
Cross 572

PLAINTIFF'S EXHIBITS.

	Offered at Page	*Printed at Page*
1—Stipulation	23	730
2—Copy of patent in suit	23	733
3—Assignment from Zinsser & Company to the plaintiff, dated April 2, 1935	24	734
4—Defendant's answers to plaintiff's interrogatories 1 to 5, and 8 to 10	24	736

	Offered at Page	Printed at Page
5—Paper containing graphs testified to by the witness Bragdon	54	741
6—Sample of ink with an alcohol solvent used by the witness Bragdon	36	....
7—Film of ink on paper, the ink being that of Exhibit 6	36	....
8—Second ink sample used by the witness Bragdon, being ink whose solvent is butyl acetate, having a vapor pressure of 1½ centimeters at room temperature	36	....
9—Film made with ink (Exhibit 8)	36	....
10—Butyl carbitol ink	38	....
11—Paper	38	....
12—Sheet which the witness Bragdon placed on top of Exhibits 7 and 9	39	....
13—Graph testified to by the witness Bragdon	54	....
14—Chart testified to by the witness Bragdon	71	743
15—Print testified to by the witness Cray as being the first heat-drying ink he saw	76	....
16id.—Memorandum in the handwriting of Dr. Dufford	78	....
17—Sheet of November 12, 1932 belonging to Mr. Finne	80	....
18—Diagram testified to by the witness Hurley	150	....
19—Sales invoices testified to by the witness Blackmore	179	....
20—Formulæ cards for the nitrocellulose lacquer having laboratory code number 895-1, and the manufacturing code number W4608	180	....

* Copy in separately filed book.

	Offered at Page	Printed at Page
21—Letter dated December 21, 1932, signed by Calvin Detrick addressed to Mr. Hayward	188	744
22—Letter to Mr. Hayward from Mr. Detrick of Manufacturers Printing Ink Corporation, dated June 5, 1933	188	745
23—Letter from Mr. Detrick to witness Hayward dated February 20, 1933	190	746
24—Letter from Mr. Detrick to witness Hayward dated March 14, 1933	191	748
25—Mr. Detrick's letter to witness Hayward dated March 31, 1933	191	750
26—Copy of telegram of May 4th and reply thereto testified to by the witness Hayward	192	751
27—Order produced by the witness Hayward dated May 26, 1933, addressed to the Manufacturers Printing Ink Corporation	194	753
28—Letter to witness Hayward from Mr. Detrick dated June 2, 1933	194	754
29—Series of invoices from the International Printing Ink Corporation running from December 19, 1933 to January 29, 1936	196	....
30—Group of invoices running from August 12, 1936, through November 18, 1942, showing purchases made from the International Printing Ink Company	199	....
31—Copies of formulæ testified to by the witness Jeuck	211	....
32—Copies of formulæ MX-3858 and MX-3859	230	....
33—Patent No. 1,460,391 to Sidney Satenstein	344	755

* Copy in separately filed book.

	Offered at Page	Printed at Page
34—Copy of pamphlet entitled "Report of Committee on Standardization of Petroleum Specifications 'Bulletin No. 5'"		354
35—United States Government specifications testified to by the witness Taylor		355
36—Catalogue of the Hilton Davis Company (cover and pp. 53, 54)		369
38—Cumar specification chart		542
39—Sheet from Life Magazine testified to by witness Busby as having been printed on one side		591
40—Sheet which was printed with heat-set inks on Press 89		593
41—Sheet testified to by witness Busby as having been printed on Press 100		594
42—Sheet which was printed on a 2-color Life 64-page press		595
43—Single-color heat set signature printed on a 64-page Life press		597
44—Single-color signature for Time Magazine printed on a 64-page Time press		597
45—Chart testified to by witness Bragdon as showing the same curve as shown in Taylor's Exhibit B-1 in the upper line drawn in red		645
46—Graph indicating the witness Bragdon's determination of the boiling point of the I. P. I. solvent		647
47—Graph drawn by the witness Bragdon to show the comparison between the curves		648
48—Photostat of pages from the book entitled "Petroleum"		650

* Copy in separately-filed book.

	Offered at Page	Printed at Page
49 id.—Boiling range of kerosene about which the witness Bragdon testified	655	756
50 id.—Proof of the vapor pressure of the kerosene about which the witness Bragdon testified	655	
51 id.—Chart showing the boiling range of the kerosene at about 250 made and testified to by the witness Bragdon and the kerosene above 250 given by Mr. Taylor on Exhibit B-1	655	
52—Chart showing the determination of the boiling range of defendant's kerosene made and testified to by the witness Bragdon	657	756
53—Comparison of formulæ produced and testified to by the witness Bragdon	658	757
54—Barrett Company's catalog (index, title page and page 12)	659	
55—Chart showing the witness Bragdon's determination of defendant's 502-C ink oil, the J. P. I. petroleum solvent mentioned in Defendant's Exhibit B-1	659	
56—Chart showing that the vapor pressure of oil of cassia at 20 degrees is about .2 of a millimeter	661	
57—Chart which shows that terpineol is very much more volatile than rosin-oil	668	759
58—Ink prepared in accordance with the formula of the Doughty patent, containing four parts of terpineol, 1 part of rosin and 10 parts of bronze powder	668	

* Copy in separately filed book.

	Offered at Page	Printed at Page
59—Statement of the ingredients of the ink given in the specific example of the Jirousek patent, showing the percentage of the different ingredients	670	760
60—Ink vehicle of the McElroy patent produced by the witness Bragdon	671	
61—Schematic drawing showing the vapor pressure measuring apparatus in the plaintiff's laboratories	687	
62—Notebook which the witness Gessler kept of his work when he was the chief chemist of the Zinsser Company (3 pages relating to Experiment 842B; 4 pages relating to Experiment 842C; and 2 pages relating to Experiment 842E)	720	
63—Letter dated February 17, 1932 from the witness Gessler to the Cray-Finne Company	705	761
64—Paper testified to by the witness Gessler as bearing his signature and dated April 4, 1932, as being a disclosure of an invention	711	762
65—Description of July 8, 1930, which is referred to at the top of Plaintiff's Exhibit 64	712	764
66 id.—Catalogs of the Carbide & Carbon Chemicals Corporation from 1930 to 1935	718	
67—Smudged Montgomery Ward sheet	559	

* Copy in separately filed book.

Defendant's Exhibits.

	Offered at Page	Printed at Page
A—Set of curves referred to by the witness Bragdon	577	
B—Letter dated May 1, 1934 from Mr. Sterner to Frank W. Cray	92	766
C—Copy of Patent No. 2,128,672, issued August 30, 1938	122	767
D—Memorandum testified to by the witness Hayward	208	
E—Filewrapper of the patent in suit	244	769
F—Plaintiff's answer to interrogatories	244	949
G—Book of patents and publications as follows	246	

United States Letters Patent.

Patent Number	Patentee	Date	
380,654	Lefferts	Apr. 3, 1888	957
1,439,696	Doughty	Dec. 26, 1922	961
1,450,692	McElroy & Clarke	Apr. 3, 1923	963
1,752,462	Smith	Apr. 1, 1930	967
1,806,965	Clewell	May 26, 1931	969
1,884,553	Bradley	Oct. 25, 1932	971
1,858,673	Lawrence	May 17, 1932	976
1,954,450	Lawrence	Apr. 10, 1934	980
1,954,627	Jirousek	Apr. 10, 1934	983

* Copy in separately filed book.

PUBLICATIONS.

	Offered at Page	Printed at Page
Fly-leaf, pp. 12 and 13 and table of physical properties in Carbide & Carbon catalogue January 1, 1929, second edition		985
Industrial & Engineering Chemistry, April, 1931, p. 17, entitled "Custom Built Solvents" by Carbide & Carbon		989
Printing Equipment Engineer, Dec., 1931, pp. 9 and 25, entitled "Plastic Printing Inks for Rapid Drying"		990
H—Piece of paper on which the witness Taylor made demonstration	263	
I—Cardboard having on it four samples of printing, testified to by the witness Taylor	578	
J—Photostatic copy of the Brewer and Gardner article	270	
K—Photostatic copy of the original of Chemical Society for 1888, pp. 42-45 inc., which is referred to in the footnote 6 of the Brewer and Gardner article	271	
L-1—Photographs of the apparatus used by the witness Taylor to determine the vapor pressure characteristics of certain solvents	572	
L-2		
L-3		
M—Report of Mr. Taylor on the vapor pressure of oil of cloves	275	

* Copy in separately filed book.

	Offered at Page	Printed at Page
N—Data sheet made by the witness Taylor in determining the vapor pressure for butyl carbitol		278
O—Chart referred to by the witness Taylor		295
P—Set of curves identified by the witness Taylor		281
Q—Set of curves showing solvents obtained from Lefferts and Stevens patent, including butyl carbitol and defendant's 5024 oil		282
R—Sample container of defendant's solvent in the ink which is claimed to infringe		283
S—Sample of the ink which was made up in accordance with the Doughty patent		286
T—Sample of the Doughty ink produced by Mr. Taylor		287
U—Sample of the Gessler ink		287
V—Sheet identified and described by the witness Taylor		293
W—Photograph illustrating the still used by the witness Taylor to obtain the petroleum fraction mentioned in the Doughty patent		294
X—Report of Mr. Taylor on the vapor pressure of kerosene fraction		294
Y—Tin of Lefferts and Stevens ink		299
Z—Sample of high boiling petroleum fraction obtained according to the Doughty patent		299

* Copy in separately filed book.

	Offered at Page	Printed at Page
A-1—Invoice and order identifying the kerosene used by the witness Taylor in making the solvent according to the Doughty patent		301
B-1—Distillation range chart testified to by the witness Taylor		304
C-1—Photograph of the standard equipment used for an A. S. T. M. distillation range test		305
D-1—Chart indicating the vapor pressures at various temperatures		306
E-1—Chart which is an enlargement of the vapor pressure chart given in "Industrial and Engineering Chemistry"		307
F-1—Print from a Montgomery-Ward catalog bearing the signature of the witness Taylor		312
G-1—Pages 316 and 317 of the 1942 Pharmacopoeia of the United States of America and p. 235 of the 1882 volume of the United States Pharmacopoeia		319
I-1—Straight line vapor pressure chart made and testified to by the witness Taylor		347
J-1—Photostatic copies of pp. 352 and the fly-leaf of the Mellon Institute book published in 1920		383
K-1—Four invoices dated January 2, January 29, January 30, and February 15, 1941, from Magie Brothers Petroleum Products to Sinclair & Carroll Company, Inc.		397

* Copy in separately filed book.

	Offered at Page	Printed at Page
LL—Laboratory report marked "Laboratory No. 144,560 dated July 1, 1941 to Magie Bros. Oil Co. from Phoenix Chemical Laboratory, Inc."	398	
M-1—Fly-leaf and pp. 124-128 inc. of Nelson's book entitled "Petroleum Refinery Engineering, First Edition", published in 1936	404	
N-1—Card produced by the witness Theuer showing the first printing of the September 1930 "Metal Progress"	425	
O-1—September 1931 issue of "Metal Progress"	487	
P-1—Printing record testified to by the witness Theuer	436	
Q-1 id.—Six page folder "Believe it or Not"	437	
R-1 id.—Formula for Jirousek ink	444	
S-1—Order and reorder of the Commer- T-1 cial Printing & Litho Company	474	
U-1—Sales slip of the A. L. Garber Company dated March 2, 1932	475	
V-1—Magazine offered in the deposition of witness Pellinger	487	
W-1—Issue of "Metal Progress" dated January 1932	487	
X-1—Issue of January 1932 "Your Garden and Home"	488	
Y-1—Issue of February 1932 "Your Garden and Home"	488	
Z-1—Issue of March 1932 "Your Garden and Home"	488	

* Copy in separately filed book

	Offered at Page	Printed at Page
A-2—Invoice dated November 18, 1942, from Sinclair & Carroll to W. F. Hall Printing Co.	520	
B-2—Metal can marked Sinclair & Carroll Company "Rotary Yellow, 1st Down, No. 20805"	525	
C-2—Metal can marked "Rotary Red, Second Down, No. 20806"	525	
D-2—Metal can marked "Rotary Black, Third Down, No. 20807"	525	
E-2—Metal can marked "Rotary Blue, 4th Down, No. 20808"	525	
F-2—Card dated November 3, 1942, entitled "Heat Set Varnish No. 20798"	522	
G-2—Formula card dated November 5, 1942, marked "Rotary Yellow, 1st Down, No. 20805"	522	
H-2—Formula card marked "Rotary Red, 2nd Down, No. 20806", dated November 5, 1942	522	
I-2—Formula card dated November 5, 1942, marked "Rotary Blue, 4th Down, No. 20808"	522	
J-2—Formula card dated November 5, 1942, marked "Rotary Black, 3rd Down, No. 20807"	522	
KK—Montgomery-Ward Christmas book of 1942, page 59	554	
LLL—Sheet of paper referred to by the witness Carroll as a "draw down"	529	

* Copy in separately filed book

	Offered at Page	Printed at Page
M-2—Certified copy of the filewrapper of the application serial No. 15,944 filed April 21, 1935, referred to in line 30, column 2 of p. 2 of the patent in suit	609	....
N-2—Four patents which were submitted by the plaintiff in Plaintiff's Particular No. 4 as follows:	576	

UNITED STATES LETTERS PATENT.

Patent Number	Patentee	Date	
1,261,885	Wood, *et al.*	Apr. 9, 1918	993
1,592,806	Brunell	July 13, 1926	998
1,665,185	Brunell	Apr. 3, 1928	1005

BRITISH LETTERS PATENT.

249,472	Ullstein	1926	1013

O-2—Article in "Industrial and Engineering Chemistry" for July 1926 which was referred to in the filewrapper of the patent in suit	577	
P-2—Letter dated July 22, 1941 from Interchemical Corporation to Messrs. Nims & Verdi	579	1016
Q-2—Doughty Patent No. 1,439,695	583	1017
R-2—Comparative curves between butyl carbitol, the plaintiff's and defendant's solvent	672	
S-2—Samples of Alchemic Gold printing identified by the witness Satenstein	693	....

* Copy in separately filed book.

	Offered at Page	Printed at Page
T-2—Assignment of the Doughty patents to Frederick H. Levey & Company in the fields of letter-press, lithographic and intaglio printing as stated in the assignment	694	1021
U-2—1929-1930 Carbide & Carbon Chemicals Corporation catalog (title page, table facing page 7 and pp. 16, 17)	722	
Opinion, Symes, D. J.		1024
Findings of fact and conclusions of law		1048
Judgment		1051
Plaintiff's motion for a new trial		1052
Affidavit in support of motion for new trial		1053
Affidavit in opposition to motion for new trial		1063
Opinion, Symes, D. J., on motion for a new trial		1065
Order denying motion for a new trial		1067
Notice of appeal		1068
Order extending time to docket appeal		1069
Further order extending time to docket appeal		1070
Further order extending time to docket appeal		1071
Order regarding exhibits		1072
Stipulation regarding record on appeal		1073
Further stipulation regarding record on appeal		1082
Stipulation as to correctness of record		1092
Certificate of Clerk		1093
Proceedings in U. S. C. C. A., Second Circuit		1094
Opinion, Hand, J.		1094
Petition for rehearing		1105
Order denying petition for rehearing		1118
Order for mandate		1119
Order allowing certiorari		1120

EXHIBITS

Plaintiff's Exhibit 1.

Stipulation as to Proofs.

IT IS HEREBY STIPULATED AND AGREED by and between counsel for the respective parties hereto as follows:

1. Plaintiff, Interchemical Corporation, formerly known as International Printing Ink Corporation, is a corporation of the State of Ohio, has a place of business at New York, New York, within the Southern District of New York, and is the owner of Letters Patent in suit, No. 2,087,190.

2. Defendant, Sinclair & Carroll Co., Inc., is a corporation of the State of New York, and has a place of business at 591 Eleventh Avenue, Borough of Manhattan, City and State of New York, within the Southern District of New York.

3. Reserving the right to object to the admission in evidence of United States and foreign patents, and publications, on any other ground or for any other reason than that copies are offered instead of originals, it is stipulated:

(a) that uncertified printed Patent Office copies or photostatic copies thereof, of United States and foreign Letters Patent may be introduced in evidence by both parties at the trial in lieu of the originals or certified copies thereof, with the same force and effect as the originals duly proved, and the dates appearing thereon shall be accepted as correct, subject to correction should error appear, and that the "Accepted" and "Public" dates given on British and French patents, respectively, shall be accepted as their dates of publication, except that it shall not be presumed under this stipulation that the disclosure in any United States patent as granted is the same as the disclosure in the application for said patent as filed or the same as the disclosure in any application of which said patent application

is claimed to be a division or a continuation if the contrary is shown to be the fact; and

(b) that photostatic copies of printed publications may be introduced in evidence at the trial in lieu of the original thereof, with the same force and effect as originals thereof duly proved, and the dates of publication appearing thereon shall be accepted as correct, and if no dates of publication appear thereon, then such publications shall be regarded as printed publications at least as early as the date they were received by any library in the United States, as indicated by the official receiving stamp of said library on said publication or as certified with reference to the records of said library by affidavit of an official thereof, subject to correction should error appear.

ROBERT W. BYERLY,
Counsel for Plaintiff.

WALTER H. FREE,
Counsel for Defendant.

Dated: New York, N. Y., December 11, 1942.

Plaintiff's Exhibit 2.

Copy of Patent No. 2,087,190.

(Opposite ☞)

Patented July 13, 1937 2,087,190

UNITED STATES PATENT OFFICE

2,087,190

PRINTING INK

Albert E. Gessler, Ardsley-on-Hudson, N. Y., assignor, by mesne assignments, to The International Printing Ink Corporation, New York, N. Y., a corporation of Ohio

No Drawing. Application July 14, 1932, Serial No. 622,453. Renewed April 11, 1936

15 Claims. (Cl. 134—36)

The present invention relates to printing inks and has for an object the preparation of a novel type of printing ink, which possesses many advantages over the printing inks heretofore known and overcomes many of the disadvantages associated with the procedure which it has been necessary to use in order that such inks may be properly applied to produce a satisfactory print.

Heretofore, printing inks have in general been made by grinding pigments in oils or oil-varnishes, or both. Such oils or varnishes have absolute viscosities of 5 poises or above at 25° C., measured by the method applied to varnish viscosities (Gardner's Physical and Chemical Examination of Paints, Varnishes, etc., fifth edition 1930, pp. 246, 152, 153) and have been characterized by their relatively slow rate of drying depending upon polymerization, oxidation and/or absorption and, as a consequence, have presented great difficulty in printing processes by greatly delaying the speed of operation. This has not only necessitated the expense and maintenance of large and cumbersome auxiliary equipment and extra labor, but has also resulted in a dependency of the printing process upon the time required to obtain a complete drying.

In order to overcome these difficulties, it has been customary to incorporate in the inks varying amounts of driers which have the ability to accelerate the speed of the oxidation and/or polymerization of the oil varnishes. However, even with all possible acceleration, the drying of the prints takes many hours or even days, necessitating in addition to the great delay in time, extra labor to remove, to store, and to return to the machines the printed material and also in many cases a great waste of paper in the form of slip-sheets which must be rolled up or stacked between the prints in order to avoid offsetting, rubbing off, smudging or sticking together.

It has also been proposed to use various types of lacquers in printing processes, particularly cellulose lacquers. As is well known, the cellulose solvents used in these lacquers are characterized by a high degree of volatility. Indeed, this characteristic is considered an advantage in lacquers, for in the ordinary use to which lacquers are put, a rapid drying or hardening is highly desirable. However, it is obvious that such rapid drying renders inks made on this principle unsuitable for printing from plates or rollers; for, while they may be applied to printing plates or rollers, they will quickly dry and harden thereon and they will have only the effect of yielding dry or half dry material to the printing form from which, therefore, no satisfactory impression can be made on the material to be printed.

I have discovered, however, that if in contrast to the above, cellulose compounds, particularly nitrocellulose, are dissolved in solvents with high boiling points, this difficulty may be avoided. Naturally, if the solvents are too slow in evaporating, the same difficulties, which occur in the case of ordinary oil varnish inks, are encountered. In this respect I have found that certain such high boiling solvents, very well adapted to dissolve cellulose compounds, have at room temperature such slow drying properties that, while they may be employed as solvents in this ink, and while an excellent impression may be transferred to the surface to be printed upon, the impression will nevertheless be so moist that it is likely to become blurred or smudged by rubbing after many hours or even days. This defect, however, may be remedied by the present invention, which involves a recognition of the principle that some of these high boiling solvents exhibit, at temperatures elevated above room temperatures, such a remarkable and quick increase in their vapor pressure that they volatilise rapidly, while at the same temperatures others show little change in their vapor pressures and therefore are practically non-volatile.

By room temperatures, I mean the ordinary temperatures of a room in which technical work is carried on, which is generally accepted to be 20° to 25° C.

As above indicated, the present invention makes use of the characteristics of these solvents having high boiling points and high vapor pressures at elevated temperatures.

The referred to solutions, in contradistinction to lacquer solutions which require highly volatile solvents, are characterised by their very low rate of evaporation at temperatures approximating room temperature and by their ability to manifest a relatively high degree of volatility when, subjected to temperatures higher than room temperature. The solvents or solvent mixtures utilized in the formation of these solutions may be described as solvents having a high boiling point combined with a low vapor pressure at room temperature, but yet further characterised by a rapid rise in their vapor pressure curves upon elevation of the temperature,—that is, by their property of evaporating quickly from a thin layer, as in a print, when the temperature is sufficiently raised. Among this peculiar class of solvents I have found as an example diethylene glycol monobutyl ether to be a solvent for nitro-

cellulose and many natural and artificial gums, very well adapted to the purposes of this invention. This solvent at room temperatures remains fluid and moist for a long period of time. When heated to about 100° C. or above, the rate of vaporization is greatly accelerated and, when used in the ink of this invention, produces a print which dries almost instantaneously when subjected to such a heat treatment.

The printing ink above briefly described may be further admixed with varying amounts of another and different class of oils or high boiling solvents possessing a very low vapor pressure over a wide range of temperatures, and characterized in that they are practically non-volatile if exposed to the heat necessary for the process. This admixture acts as a plasticizer and tends to prevent the brittle characteristic of a film consisting of nitrocellulose or gums alone.

The following specific example is illustrative of my invention as applied to the production of a yellow printing ink particularly. The ink may be made up as follows: 100 parts of chrome yellow, 35 parts of nitrocellulose (low viscosity), 55 parts of diethylene glycol monobutyl ether, 10 parts of dibutylphthalate, and 10 parts of blown castor oil.

The above composition may, for example, be prepared by grinding or otherwise dispersing the pigment in a solution of the nitrocellulose in diethylene glycol monobutyl ether. The two other ingredients may be introduced in such order as may be expedient. It will, of course, be recognised that the yellow pigment may be replaced by any suitable pigments or dyestuffs and/or mixtures thereof; that the nitrocellulose may be replaced by other cellulose compounds and/or by natural or synthetic resins. Moreover, the dibutylphthalate may be replaced by any other suitable agent, effective to prevent brittleness in the finished product. Also, the blown castor oil which has been included in the specific formula given may be replaced by other suitable materials. It may be desirable in some circumstances to omit the last two types of ingredients referred to in the illustrative formula, namely, those which have been added in order to offset extreme hardness and brittleness.

Diethylene glycol monobutyl ether is a practically odorless, saturated, aliphatic or open-chain chemical compound of carbon, hydrogen and oxygen.

The diethylene glycol monobutyl ether may be replaced by other solvents or solvent mixtures possessing a similar low rate of evaporation at ordinary temperatures and a marked acceleration of volatility at raised temperatures. These important properties of diethylene glycol monobutyl ether, the preponderant solvent constituting the major part of the liquid component of the ink in the example given, may, for comparative purposes, be indicated numerically in terms of its vapor pressure at different temperatures which, as determined by Brewer and Gardner in "Industrial and Engineering Chemistry", vol. 29, No. 2, p. 179, February, 1937, are as follows:

	Mm. of mercury
At 20° C.	0.02
At 100° C.	6.4
At 150° C. about	60.0

These vapor pressures indicate that, at elevated temperatures, this solvent becomes a highly volatile liquid like such highly volatile liquids as, for example, ethyl alcohol which has a vapor pressure of about 40 mm. at ordinary room temperature. The vapor pressures of my preponderant solvent at elevated temperatures contrast sharply with those of the high boiling solvents ordinarily termed "plasticizers" such as dibutyl phthalate, a minor proportion of which is used in the specific formula given. The vapor pressure of this liquid, according to Brewer and Gardner, is 0.45 mm. at 100° C. and 1.4 mm. at 150° C. The vapor pressures of diethylene glycol monobutyl ether indicate that this solvent will evaporate almost instantaneously at elevated temperatures like ethyl alcohol at ordinary temperatures, while such high boiling solvents or plasticizers as dibutyl phthalate evaporate only slowly when heated to temperatures of 100° C. or 150° C.

With ink prepared as above, the printing operation may be carried out in the ordinary manner and at ordinary temperatures. At the conclusion of the printing operation, the printed materials may be subjected, in known manner, to sufficient heat to dry the thin film of the print very rapidly. Thus a finished print is obtained immediately at the end of the printing and heating operation and no time, labor, nor material is wasted in delays incident to the prolonged drying of the printed goods under the processes at present in use. This method of printing is not claimed herein as it forms the subject matter of my co-pending application, Serial No. 15,944, filed April 12, 1935, which is in part a continuation of this application.

The novel ink and process described above are not only capable of utilization in printing upon paper, but they are also adapted for use in making very satisfactory prints upon many other surfaces, such as for instance textiles or metallic surfaces, or the lacquered surfaces of Cellophane, or the like, where the production of a satisfactory print has heretofore been much restricted.

It is apparent that such an ink as has been described does not necessitate the admixture of driers, does not set or harden on the printing rollers or plates, but is yet capable of being dried very quickly when subjected to suitable temperatures after being printed, by the evaporation of the solvent from the thin layer of the print. The finished products are flexible prints in which the pigment is well protected against being rubbed off. They are not softened by moisture, grease, or chemical influences and possess practically no odor. The ink adheres securely to almost every type of surface.

What I claim is:

1. A printing ink which is substantially non-drying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink—the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, and the major part of the liquid component being a chemical compound containing carbon, hydrogen and oxygen which dissolves and forms a stable solution with the solid component and which has a vapor pressure which, at 20° C., is as low as the vapor pressure of diethylene glycol monobutyl ether at 20° C., and, at 150° C., approximates that of ethyl alcohol at ordinary temperatures.

2. A printing ink which is substantially non-drying at ordinary temperatures and dries in-

stantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink—the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, and substantially 73% of the liquid component being a chemical compound containing carbon, hydrogen and oxygen, which dissolves and forms a stable solution with the solid component and which has a vapor pressure which, at 20° C., is as low as the vapor pressure of diethylene glycol monobutyl ether at 20° C., and, at 150° C., approximates that of ethyl alcohol at ordinary temperatures.

3. A printing ink which is substantially nondrying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component completely dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink—the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, substantially all of the liquid component having a vapor pressure at 20° C. as low as that of diethylene glycol monobutyl ether at 20° C., and the major part of the liquid component having a vapor pressure which at 150° C. approximates that of ethyl alcohol at ordinary temperatures and forming a stable solution with the solid component.

4. A printing ink which is substantially nondrying at ordinary temperatures and dries rapidly at 150° C., consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component—being a member of the group consisting of natural and synthetic resins and cellulose compounds—dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink, in which the major part of the liquid component is an ether including one butyl radical and one diethylene glycol radical and having a vapor pressure which at 20° C. is as low as the vapor pressure of diethylene glycol monobutyl ether at 20° C., and at 150° C. approximates that of ethyl alcohol.

5. A printing ink which is substantially nondrying at ordinary temperatures and dries rapidly at 150° C., consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component—being a member of the group consisting of natural and synthetic resins and cellulose compounds—dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink, in which the major part of the liquid component is monobutyl ether of diethylene glycol.

6. A printing ink which is substantially nondrying at ordinary temperatures and which dries rapidly at 150° C. consisting of a coloring matter dispersed in a viscous fluid vehicle consisting of a liquid component the major portion of which is an organic solvent forming stable solutions with both nitrocellulose and resin having a vapor pressure which at 20° C. is as low as the vapor pressure of diethylene glycol monobutyl ether at 20° C., and at 150° C. approximates that of ethyl alcohol, and a solid component completely dissolved in the liquid component in an amount at least 47% of the amount of said liquid component, said solid component being a member of the group consisting of natural and synthetic resins and low viscosity cellulose esters.

7. A printing ink which is substantially nondrying at ordinary temperatures and which dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component dissolved in a liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink—the solid component being a cellulose compound, and the major part of the liquid component being a chemical compound which dissolves and forms a stable solution with the solid component and which has a vapor pressure which at 20° C. is as low as the vapor pressure of diethylene glycol monobutyl ether at 20° C., and at 150° C. approximates that of ethyl alcohol at ordinary temperatures.

8. A printing ink which is substantially nondrying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink—the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, and the major part of the liquid component being an aliphatic chemical compound containing carbon, hydrogen and oxygen which dissolves and forms a stable solution with the solid component and which has a vapor pressure which, at 20° C., is as low as the vapor pressure of diethylene glycol monobutyl ether at 20° C., and, at 150° C., approximates that of ethyl alcohol at ordinary temperatures.

9. A printing ink which is substantially nondrying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink—the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, and the major part of the liquid component being a saturated chemical compound containing carbon, hydrogen and oxygen which dissolves and forms a stable solution with the solid component and which has a vapor pressure which, at 20° C., is as low as the vapor pressure of diethylene glycol monobutyl ether at 20° C., and, at 150° C., approximates that of ethyl alcohol at ordinary temperatures.

10. A printing ink which is substantially nondrying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component completely dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink—the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, substantially all of the liquid component having a

vapor pressure at 20° C. as low as the vapor pressure of diethylene glycol monobutyl ether at 20° C., and the major part of the liquid component having an open-chain structure and a vapor pressure which at 150° C. approximates that of ethyl alcohol at ordinary temperatures and forming a stable solution with the solid component.

11. A printing ink which is substantially non-drying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component completely dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink—the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, substantially all of the liquid component having a vapor pressure at 20° C. as low as the vapor pressure of diethylene glycol monobutyl ether at 20° C., and the major part of the liquid component having a vapor pressure which at 150° C. approximates that of ethyl alcohol at ordinary temperatures and being a saturated compound forming a stable solution with the solid component.

12. A printing ink adapted for use on paper, comprising a coloring material in a vehicle containing essentially a binder for the coloring material and a solvent for the binder, said binder forming a stable solution in said solvent and being present in amount sufficient to give the ink the consistency of ordinary oil-varnish printing inks, and to protect the coloring material against being rubbed off when the ink is applied by an ordinary printing press, and substantially all of said solvent having a vapor pressure at 20° C. as low as that of diethylene glycol monobutyl ether at 20° C., and developing such a marked increase in vapor pressure at elevated temperatures of 100° C. or above, to which printed paper can be subjected, that its vapor pressure at 150° C. approximates that of ethyl alcohol at ordinary temperatures and that it practically immediately evaporates from a thin film of ink at such temperatures, whereby said ink is stable on the printing press and capable of being immediately dried upon the application of heat following the printing operation.

13. A printing ink consisting of pigment dispersed in an organic viscous vehicle, consisting of a liquid component and a solid component—the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, and being dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink, and to bind the pigment to paper when the ink is applied by an ordinary printing press, and substantially all of the liquid component having a vapor pressure at 20° C. which is as low as the vapor pressure of diethylene glycol monobutyl ether at 20° C., and the major part of the liquid component having a vapor pressure which at 150° C. approximates that of ethyl alcohol at ordinary temperatures and forming a stable solution with the solid component.

14. A printing ink comprising a coloring material in a vehicle consisting of a solid component, composed principally of a binder of the group consisting of natural and synthetic resins and cellulose esters, and a liquid component, composed principally of volatilizable solvent for the binder, said binder being present in amount approximately one-half to two-thirds of said liquid component, by weight, and said solvent having a vapor pressure at 20° C. as low as that of diethylene glycol monobutyl ether at room temperatures of 20° C., and having a vapor pressure at 150° C. equivalent to that of ethyl alcohol at room temperature.

15. A printing ink having a consistency suitable for ordinary printing and comprising a coloring material and a vehicle therefor including a liquid component and a solid component, said solid component being principally a binder for said coloring material, and said liquid component consisting essentially of a minor proportion of an agent adapted to prevent brittleness of the binder and a major proportion of a volatilizable solvent having vapor pressure at 20° C. as low as that of diethylene glycol monobutyl ether at room temperatures of 20° C., and a vapor pressure at elevated temperature of 150° C. equivalent to that of ethyl alcohol at ordinary room temperature.

ALBERT E. GESSLER.

Plaintiff's Exhibit 3.

Assignment.

WHEREAS, ZINSSER & COMPANY, INC., a New York corporation, of Hastings-on-Hudson, New York, is the sole and exclusive owner of an application for Letters Patent of the United States, which invention is described as:

> Application, Serial No. 622,453, filed July 14, 1932 by Albert E. Gessler, for Improvements in Printing Ink and Method of Utilizing Same;

and of all inventions which have been or may be claimed in said application or any applications filed therefor; and

WHEREAS, THE INTERNATIONAL PRINTING INK CORPORATION, a corporation of the State of Ohio, having an office and place of business at 75 Varick Street, New York City, New York, is desirous of obtaining the entire right, title and interest in and to said inventions and application and all Letters Patent of the United States which may be granted therefor;

NOW, THEREFORE, in consideration of One Dollar ($1.00) and other good and valuable considerations, receipt of which is hereby acknowledged, said ZINSSER & COMPANY, INC., has sold, assigned and transferred, and by these presents does sell, assign and transfer to said THE INTERNATIONAL PRINTING INK CORPORATION, its legal representatives and assigns, the entire right, title and interest in and to the hereinbefore identified application for Letters Patent of the United States, in and to all inventions claimed or which may be claimed in said application or any additional applications to be filed therefor, and in and to all Letters Patent of the United States which may be granted on said applications or any of them or for said inventions or any of them, together with all reissues or extensions of such Letters Patent or any of them.

Plaintiff's Exhibit 3.

For the same considerations, said ZINSSER & COMPANY, INC., its legal representatives and successors, covenant and agree to execute and deliver to said THE INTERNATIONAL PRINTING INK CORPORATION, its successors and assigns, any further documents or instruments which may be necessary and proper to enable said THE INTERNATIONAL PRINTING INK CORPORATION, its successors and assigns, to file applications for said inventions or any of them in any country where it may elect to file such applications, and that may be necessary and proper to vest in said THE INTERNATIONAL PRINTING INK CORPORATION, its successors and assigns, the title herein conveyed, and to enable such title to be recorded in the United States Patent Office and in foreign countries where such application or applications may be filed.

IN WITNESS WHEREOF, ZINSSER & COMPANY, INC. has caused this instrument to be filed and its corporate seal to be applied hereto by its officers thereunto duly authorized, this 2nd day of April, 1935.

ZINSSER & COMPANY, INC.

By J. L. BERSTON,
Vice President.

(SEAL)

Attest:

H. T. STABER,
Secretary.

Plaintiff's Exhibit 4.

STATE OF NEW YORK }
COUNTY OF WESTCHESTER } ss.:

On the 2nd day of April, 1935, before me personally appeared J. L. BERSTON and H. T. STABER, to me known to be the persons who executed the foregoing instrument as president and secretary, respectively, of ZINSSER & COMPANY, INC., a corporation of the State of New York, and acknowledged that they being duly authorized to execute the same on behalf of said corporation did execute the same as their free and voluntary deed and act and the free and voluntary deed and act of said corporation.

R. A. NEELY,
Notary Public

Notary Public
Westchester Co., N. Y.
My Commission Expires
March 30, 1936

(NOTARIAL STAMP)

(NOTARIAL SEAL)

Plaintiff's Exhibit 4.

Defendant's Answers to Plaintiff's Interrogatories.

To the following interrogatories propounded by plaintiff under Rules 33 and 34 of the Rules of Civil Procedure, defendant makes verified answer by its duly qualified officer, as follows:

1. Did you make or sell between July 13, 1937 and August 28, 1941, any typographic printing ink adapted to be dried or set by heat and containing a pigment dis-

persed in a vehicle composed of a solid component dissolved in a liquid component?

Answer: Yes.

2. Have you between July 13, 1937 and August 28, 1941, sold or furnished any such printing inks for use on rotary typographic printing presses provided with heating units for heating the printed matter?

Answer: Yes.

3. If your answer to the preceding interrogatory is in the affirmative, state whether any of the printing inks which you furnished for use on rotary typographic presses provided with heating units were sufficiently stable on the rollers of such presses to make possible their use on such presses, and whether any of such inks dried or set when the paper on which they were printed was passed through the heating units of said presses.

Answer: Yes, it being understood that the term "stable" as used in this and other interrogatories means "unchanging" as the term is defined by plaintiff.

4. If your answer to interrogatory 3 is in the affirmative, state when you first furnished such inks.

Answer: April 12, 1938.

5. Before you first furnished such inks were you informed that the company or companies to whom you proposed to sell them had in its plant or their plants rotary typographic printing presses equipped with heating units for heating the printed paper?

Answer: Yes.

8. If your answer to Interrogatory 3 is in the affirmative, identify specifically by color and identifying name some printing inks which you sold between July 13, 1937 and August 28, 1941, to Crowell-Collier Publishing Company, Springfield, Ohio, which were stable enough on the rollers of the purchasers' presses to permit their use thereon

and which dried or set when the paper was passed through the heating units of such presses.

Answer: Defendant sold the following inks to the Crowell-Collier Publishing Company, Springfield, Ohio, during February, 1941:

Fisher Blue
Cudahy Blue
Fisher Red
Cudahy Red
Fisher Yellow
Black

9. Furnish to plaintiff's attorney a sample of each of the inks specified in your answer to Interrogatory No. 8 and a sample of the solvent used in each of said inks and state the classes of ingredients in said inks.

Answer: Defendant has furnished to plaintiff's attorney one sample of each of said original inks, and also one sample of defendant's solvent, "502-C Ink Oil", which was used in each of said inks. The proportions of the classes of ingredients contained in the inks are as follows:

Fisher Blue	—Pigment	49.4%	
	Solvent	25 %	
	Resin	19 %	
Other ingredients		6.6%	(1.9% solid, 4.7% liquid)
		100 %	

Cudahy Blue	—Pigment	48 %	
	Solvent	25.7%	
	Resin	19.4%	
Other ingredients		6.9%	(2% solid, 4.9% liquid)
		100 %	

Plaintiff's Exhibit 4.

Fisher Red	—Pigment	35 %
	Solvent	25.2%
	Resin	27.3%
Other ingredients		12.5% (5.9% solid, 6.6% liquid)
		100 %

Cudahy Red	—Pigment	36 %
	Solvent	25.2%
	Resin	26.4%
Other ingredients		12.4% (6% solid, 6.4% liquid)
		100 %

Fisher Yellow	—Pigment	57.2%
	Solvent	13.9%
	Resin	17.5%
Other ingredients		11.4% (4% solid, 7.4% liquid)
		100 %

Black	—Pigment	80.8%
	Solvent	28.3%
	Resin	4.6%
	Gilsonite	18.5%
Other ingredients		17.8% (13.3% solid, 4.5% liquid)
		100 %

The "other ingredients" referred to above consist of linseed varnish and/or perilla varnish, wax and/or grease, drier, etc.

10. Did the defendant receive from plaintiff before the filing of the Bill of Complaint herein a written notice charging defendant with infringement of the patent in suit?

Answer: Yes, by letter dated July 9, 1941.

Sinclair & Carroll Co., Inc.

By Roy Carroll,
Vice President.

Plaintiff's Exhibit 5.

VERIFICATION

STATE OF ILLINOIS, }
COUNTY OF COOK, } ss.:

ROY CARROLL, being duly sworn, deposes and says that he is Vice President of Sinclair & Carroll Co., Inc., the corporate defendant herein; that he subscribed the foregoing answers to plaintiff's interrogatories on behalf of said corporate defendant; that he has read the answers and knows the contents thereof, and that the same are true and correct.

ROY CARROLL.

Sworn to and subscribed before me }
this 1st day of December, 1942. }

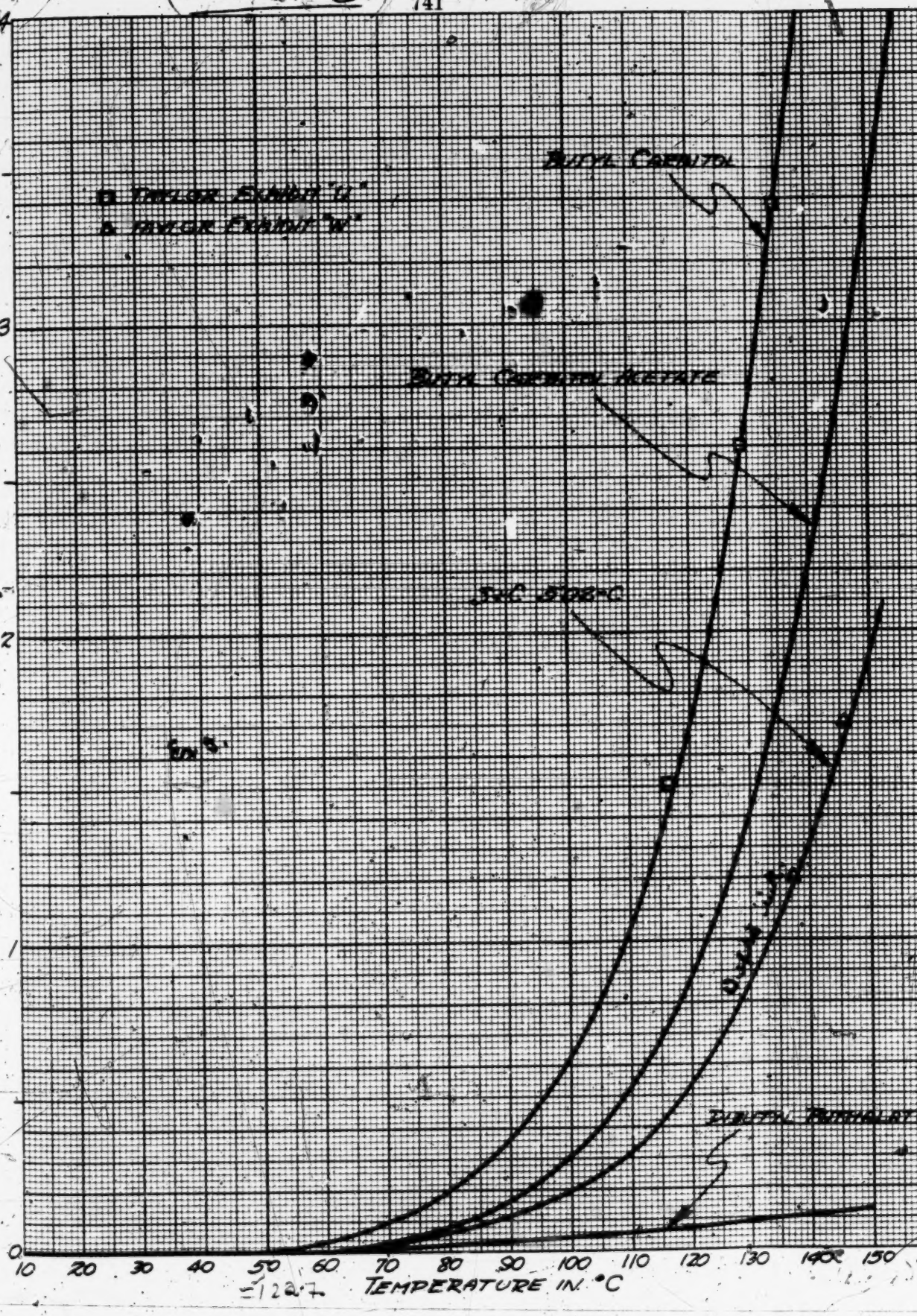
LOUISE E. GROSS,
Notary Public.

(SEAL)

Plaintiff's Exhibit 5.

Graph.

(*Opposite* ☞)



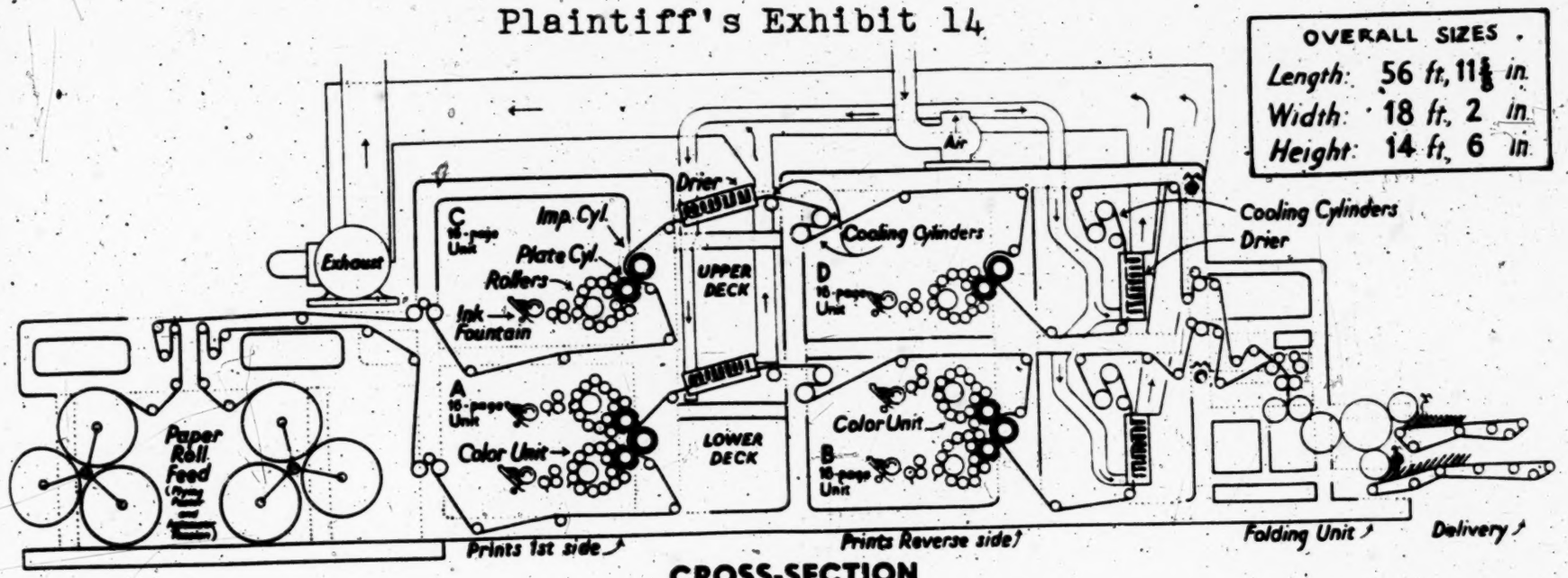
VAPOR PRESSURE IN CM
TAYLOR EXHIBIT "U"
TAYLOR EXHIBIT "W"
BUTYL CARBITOL
BUTYL CARBITOL ACETATE
S+C 502-C
DIBUTYL PHTHALAT
0
1
2
3
4
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
TEMPERATURE IN °C

Plaintiff's Exhibit 14.

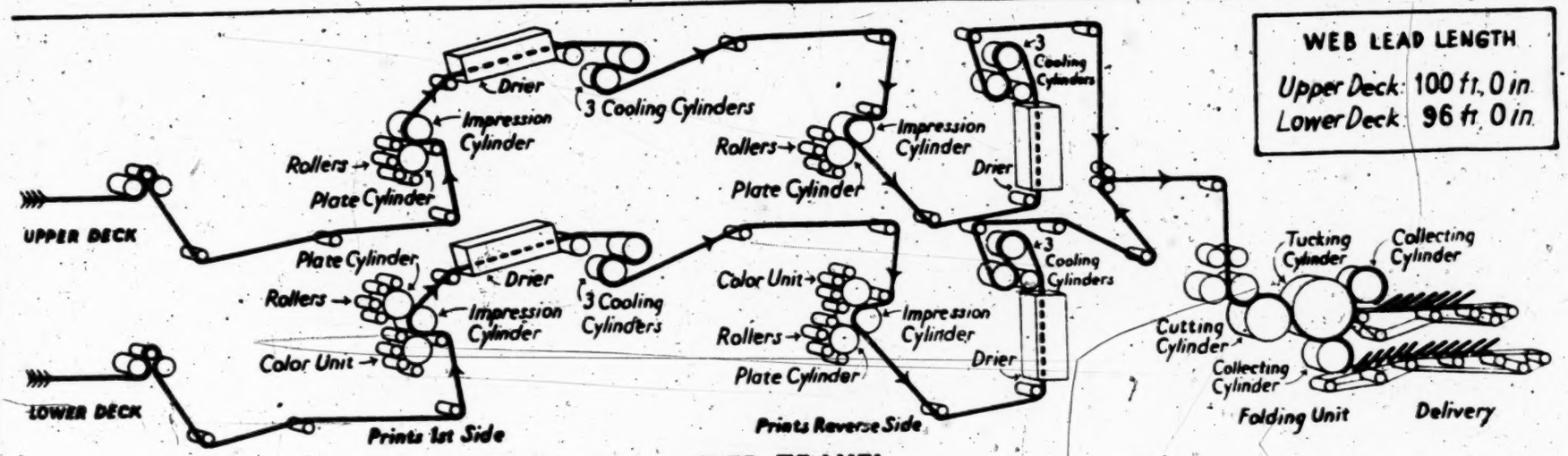
Chart.

(*Opposite* ☞)

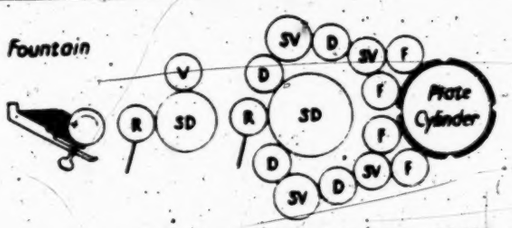
Plaintiff's Exhibit 14



CROSS-SECTION



WEB TRAVEL



Each Unit: 4 Form Rollers F
4 Distributors D
2 Ductors R
1 Vibrator V
4 Steel Vibrators SV
2 Steel Distributing Drums SD

DETAIL OF INKING MECHANISM AND INK DISTRIBUTION
(One Unit)

Plaintiff's Exhibit 21.

MANUFACTURERS PRINTING INK CORPORATION
Printing and Lithographing Inks
Dry Colors and Varnishes
196-204 Wallabout Street
Brooklyn, N. Y.

December 21st, 1932

Mr. J. Kindelberger,
Kalamazoo Vegetable Parchment Paper Co.,
Parchment, Michigan

My dear Mr. Kindelberger:—

I had the pleasure this morning of showing to your Mr. Horton at the New York Office some breadwrappers run with our new quick drying inks, and Mr. Horton advised me to write you in connection with same.

Our quick drying inks are a recent development, and will dry instantly by applying them to heat. We have made tests on very many paper stocks during the past year, and are now ready to offer these inks to the trade.

For Rotary presses we have had the best results by running the paper over a steam jacketed cylinder, glassine, parchment or breadwrapper paper stock, and found that the ink dries perfectly at a speed of about 325 feet a minute with 10 pounds of steam. For higher speeds, we found that it was necessary to put on an extra cylinder, and in so doing, the ink dried well up to a speed of 700 feet per minute.

The printing qualities of the ink are excellent—it lays well and prints well, running clean and sharp at all times. On breadwrapper stock we found that it was not necessary to dry the ink before running it thru the wax, as the heat of the wax completed the drying of the ink, and from tests here, it did not bleed in the wax.

If you would be interested in an ink of this kind, we should be glad to arrange for a demonstration at your plant if you may wish.

Awaiting to hear from you further, and with the compliments of the season, I am

Very cordially yours,

CALVIN DETRICK.

CD-JS

Plaintiff's Exhibit 22.

MANUFACTURERS PRINTING INK CORPORATION
Printing and Lithographing Inks
Dry Colors and Varnishes
196-204 Wallabout Street
Brooklyn, N. Y.

January 5th, 1933

Kalamazoo Vegetable Parchment Co.,
Parchment, Michigan

Att'n Mr. R. A. Hayward, Vice Pres. & Gen. Mgr.

Gentlemen:—

We are pleased to acknowledge receipt of your letter of December 29th, and, under ordinary circumstances would be very pleased to send out to you any quantity you may desire of this ink to try, but inasmuch as it is entirely new, we have been carrying on our demonstrations more or less in secrecy. Furthermore, inasmuch as your pressmen have had no experience with an ink of this character, it would be almost necessary that I be there when the test is run.

We feel that the ink is most satisfactory for your work and requires no high pressure salesmanship, as the demonstration will prove the merits of the product. This ink is only practical for the large users, and we feel certain it will afford a very great saving to you.

Whenever it is agreeable to you, I would be very glad to go to Parchment if you will advise me the date most convenient to you.

Awaiting your further advices and with our best wishes for the New Year, I am

Very sincerely yours,

CALVIN DETRICK.

CD-JS

Plaintiff's Exhibit 23.

PHONE: WILLIAMSBURG { 5-4287
5-4288

MANUFACTURERS PRINTING INK CORPORATION
Printing and Lithographing Inks
Dry Colors and Varnishes
196-204 Wallabout Street
Brooklyn, N. Y.

February 20th, 1933.

Kalamazoo Vegetable Parchment Co.,
Parchment, Michigan

Att'n Mr. R. A. Hayward

Dear Mr. Hayward:

I am in receipt of your letter of February 9th, and I am very sorry that you were not able to go to the Convention, as I had been looking forward to meeting you in New York with a great deal of pleasure.

As per your request, I am enclosing a small sample of our Ink, together with two prints made on a hand press in our laboratory on your Basis 30 parchment stock. I would be very glad to have you put these prints thru your regular test to determine whether or not the ink meets your requirements. From experiments we have made here it seems to be quite satisfactory.

Regarding the Ink, I would suggest that in order to show how this ink will dry that you tap out a small quantity on a piece of paper and hold a lighted match under it. We have experimented with several different types of heaters and we get the best results by running the sheet over a heated cylinder, preferably steam, inasmuch as it is so much cheaper than gas and electricity. This cylinder should be twenty to thirty inches in diameter in order to get as large a surface for the paper to run over as possible, similar to the method used in Intaglio printing by the rotogravure

sections of newspapers. The ink, of course, is made to dry rapidly under heat but it will air dry in fifteen to twenty minutes, although cannot be re-wound until dry on account of offset. This applies to papers which are not waxed. If the paper is to be waxed, most any kind of stock can be used—sulphite, bond or glassine, and it is not necessary to dry the ink as it will not mix with the wax, lays well and the heat of the wax dries the ink enough so that it will finish drying in a short time thereafter.

We have made many experiments running the paper from the press directly thru the waxer which is hooked up at the other end and re-wound with very desirable results.

As explained to you before, we have been carrying on our experiments more or less in secrecy as it is not our desire to contact with everybody, and intend to offer the ink to the larger users who have the necessary heating equipment to dry same or will equip their presses with it. At the present time we are not offering this to any of your competitors, feeling that perhaps you might wish to discuss this with us if the ink meets with your requirements. Therefore, this matter will be held in abeyance until we come to some understanding with you.

The ink has a slight odor in the mass, but loses this odor practically entirely when dry.

This ink will cost about double the price for the same quality of regular inks, but our experience so far has been that it gives 35 to 50% greater coverage than ordinary ink and consequently it brings the cost back to approximately what you are now paying.

We wish to impress upon you that this is not just another printing ink, but is an entirely different process or new departure from what is ordinarily manufactured for printing purposes today.

The sample enclosed, of course, will give you some idea of how rapidly the ink dries, but a practical test will convince you that we have something which should prove of valuable interest to you.

Plaintiff's Exhibit 24.

I shall be glad to make the trip to your plant for a test whenever you advise me it is convenient.

Awaiting the favor of your further advices, I am

Very sincerely,

CALVIN DETRICK,

CD-JS

Plaintiff's Exhibit 24.

PHONE, WILLIAMSBURG { 5-4287 / 5-4288

MANUFACTURERS PRINTING INK CORPORATION
Printing and Lithographing Inks
Dry Colors and Varnishes
196-204 Wallabout Street
Brooklyn, N. Y.

March 14th, 1933

Mr. R. A. Hayward,
Kalamazoo Vegetable Parchment Co.,
Parchment, Michigan

Dear Mr. Hayward:—

We are pleased to acknowledge receipt of your letter of March 8th, and in reply, I am enclosing a small print which was made with Supercet Ink. This ink does not rub off under the wax, and I think the difficulty you experienced was probably because you rubbed it too soon after waxing. The attached sample was run thru the wax wet without a heater. We find that the ink must continue to dry after waxing at least over nite, which sets it perfectly hard. The print enclosed is very poor but is the only thing I have at the office at present and was made without any make-ready.

Plaintiff's Exhibit 24.

Supercet Ink has a slight odor before and after waxing, but you will find that this odor evaporates very quickly in the air; in fact, our experience has been that it has less odor when perfectly dry than regular printing ink. If you wish to eliminate the odor before waxing, would suggest that you run it over a heated cylinder and dry it before running it thru the wax.

As regards sending you a sample, would be glad to do so, but believe it is very necessary, to get the best results, that someone be there when you make your test, who understands this new ink and who can answer questions and explain any conditions which might arise. I wish to bring out that this is an entirely new departure from regular printing ink, and I want you to know all its possibilities. Please understand that my trip does not involve any obligations on your part, and I do not wish you to be under any disadvantage at the time you make your run. By this I do not mean that it is difficult to run the ink—quite the contrary. I find that it prints as well as any ink we have ever seen; furthermore, if there are any special difficulties which might arise in your plant I would have an opportunity to overcome them. There is no question about the ink working, as I have seen it on a full days run and experienced no printing difficulties whatsoever, but in order to show the ink up to best advantage and to determine any adjustments which might have to be made, I would like to be at your plant when the run is made.

Awaiting the favor of your further kind reply, I am

Sincerely yours,

CALVIN DETRICK

CD-JS

Plaintiff's Exhibit 25.

PHONE, WILLIAMSBURG { 5-4287
5-4288

MANUFACTURERS PRINTING INK CORPORATION
Printing and Lithographing Inks
Dry Colors and Varnishes
196-204 Wallabout Street
Brooklyn, N. Y.

March 31st, 1933

Mr. R. A. Hayward;
Kalamazoo Vegetable Parchment Co.,
Parchment, Michigan

Dear Mr. Hayward:—

I am pleased to acknowledge receipt of your letter of March 27th, together with samples of Red and Black Ink for matching purposes.

I expect to make my regular trip about the 15th of April, and which would make it possible for me to be at your plant during the week of the 17th of April. I will have enough ink with me to make a satisfactory run at that time. As soon as I know more definitely, I will advise you the exact date I will be there.

If this is not convenient for you, kindly let me know.

Sincerely yours,

CALVIN DETRICK

CD-JS

Plaintiff's Exhibit 26.

TELEGRAM — CONFIRMING COPY

From
KALAMAZOO VEGETABLE PARCHMENT CO.
KVP
Kalamazoo, Michigan

Via | Lines | Charges | Class | Time Sent | Date

May 4, 1933

To
Manufacturers Printing Ink Corporation
196-204 Wallabout Street
Brooklyn, New York

CONDITIONS MAKE IT DESIRABLE MR. DETRICH COME TUESDAY MAY NINE

RAH:HDW

R. A. HAYWARD

MANUFACTURERS PRINTING INK CORPORATION
Printing and Lithographing Inks
Dry Colors and Varnishes
196-204 Wallabout Street
Brooklyn, N. Y.

May 2nd, 1933

Mr. R. A. Hayward,
Kalamazoo Vegetable Parchment Co.,
Parchment, Michigan

Dear Sir:—

In response to your telegram received yesterday, beg to advise you that our Mr. Detrick will leave New York Friday evening and arrive at Kalamazoo I believe at 10 A.M. Sat-

Plaintiff's Exhibit 27.

urday morning, the 6th inst. He will go directly to your office.

Thanking you kindly in advance for any courtesy shown him at that time, we remain

Very truly yours,

MANUFACTURERS PRINTING INK CORP'N

H. T. WINCHELL,
Treas.

HTW-JS

Plaintiff's Exhibit 27.

Order, dated May 26, 1933.

(Opposite [illegible])

knowledged

Ship 193

ver to ink dept.

Charge to wax print

ify

PURCHASE ORDER
PURCHASING DEPT. COPY

P. ase Order Number

Use this number on Invoice and Package and in Correspondence **No. 78377**

Requisition No.

Department

Stores or Div.

Date May 26, 1939

Shipped Via

Date Shipped

Ship When

F. O. B.

TO

Manufacturers Printing Ink Co.
196-204 Wallabout St.
Brooklyn, N.Y.

Ship Via

Terms

QUANTITY ORDERED	DESCRIPTION	PRICE	PER	MEMO.
200#	Heinz yellow @ .90	6/6		6/19
65#	" blue @ 1.05			
6#	" red @ 1.15			
	Blue must trap over yellow			
	Inks must be so that small printing will not fill			
	Must match wet samples inclosed exactly			
	This is very particular job			Inv. Passed for Discount
	Samples of printing inclosed			Date
	Advise when inks will be delivered so can arrange press for trial run			Amt
	EXHIBIT U. S. Dist. Court S. D. of N. Y. JAN 19 1943.			
		A. H. Fitzgerald		

DOCKET DIVISION MAY 19 1939

753

Plaintiff's Exhibit 28.

MANUFACTURERS PRINTING INK CORPORATION
Printing and Lithographing Inks
Dry Colors and Varnishes
196-204 Wallabout Street
Brooklyn, N. Y.

June 2nd, 1933

Mr. R. A. Hayward,
Kalamazoo Vegetable Parchment Co.,
Parchment, Mich.

Dear Mr. Hayward:—

Referring to our telephone conversation this morning and confirming wire, the inks are being shipped today in a Detroit car which arrives in Detroit on Monday morning. They should then arrive in Kalamazoo Tuesday morning.

As explained to you on the 'phone, I expect to be up North the first of the week and believe I can be in Kalamazoo on Wednesday of next week, June 7th. If you can have the job ready to run at that time, it will work in with my plans very nicely.

If this will not be convenient for you, will you notify our office by wire on Monday so that they can get in touch with me.

Very sincerely,

CALVIN DETRICK.

CD

Plaintiff's Exhibit 33.

Patent No. 1,460,391.

(*Opposite* ☞)

July 3, 1923. 1,460,391

S. SATENSTEIN

METHOD OF STAMPING BOOKBINDINGS AND THE LIKE

Filed March 29, 1922

Fig. 1,

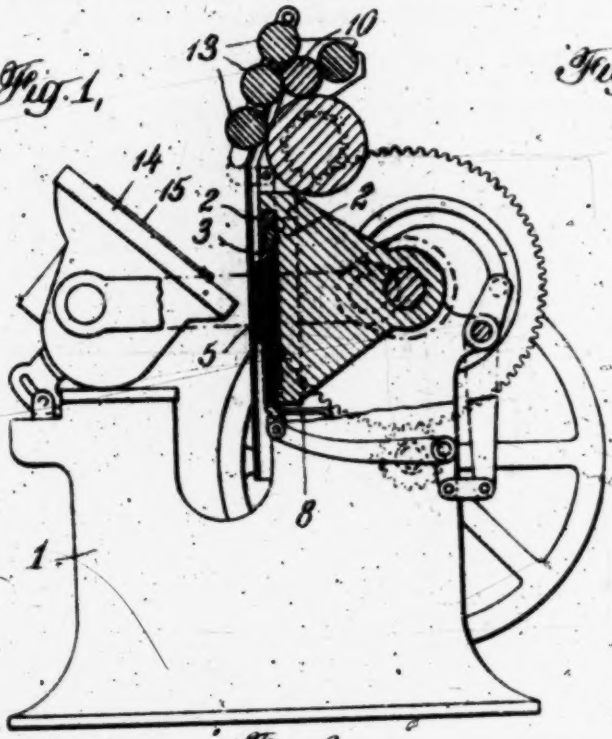


Fig. 3,

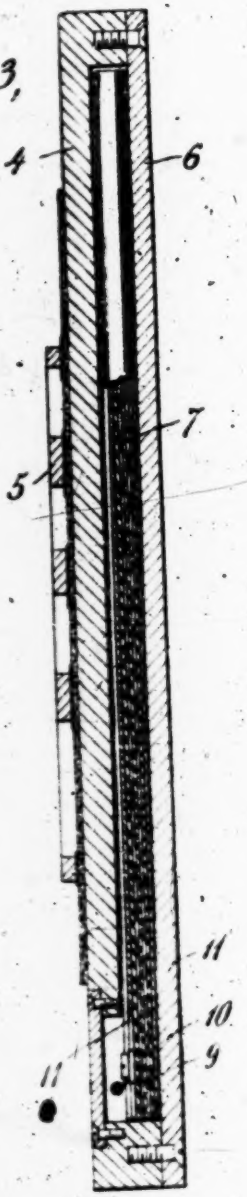


Fig. 2,

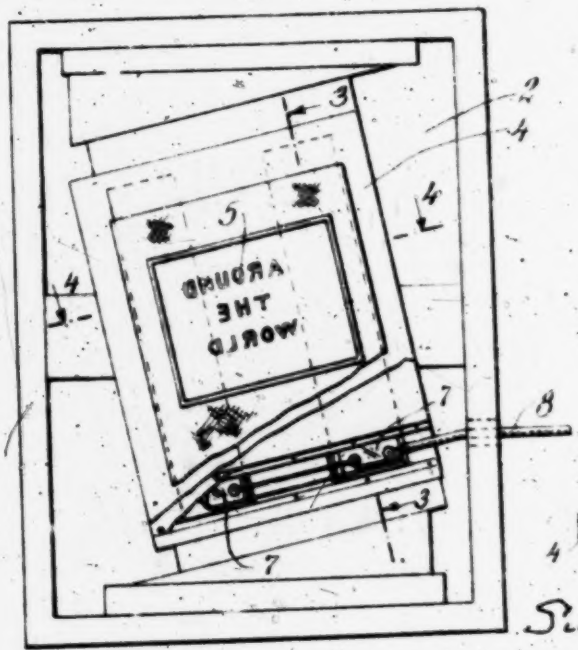


Fig. 4,

Inventor:
Sidney Satenstein
By his Attorneys
Penne Davis Mason & Edmonds

Patented Jul. 3, 1923. 1,460,391

UNITED STATES PATENT OFFICE.

SIDNEY SATENSTEIN, OF NEW YORK, N. Y., ASSIGNOR TO ALCHEMIC GOLD COMPANY, INC., A CORPORATION OF NEW YORK.

METHOD OF STAMPING BOOKBINDINGS AND THE LIKE.

Application filed March 29, 1922. Serial No. 547,715.

To all whom it may concern:

Be it known that I, SIDNEY SATENSTEIN, a citizen of the United States, residing at New York city, in the county of New York, State of New York, have invented certain new and useful Improvements in Methods of Stamping Bookbindings and the like; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to the printing or stamping of book-bindings, labels, hat bands, and generally to the application of impressions to any surface. The invention is particularly adaptable to the titling and decoration of bindings, although it is not limited to such use, and it is my intention to claim the method as described for all uses for which it may be employed.

In the preparation of bindings and the like, it has been customary heretofore to size and sometimes to oil the surface to which metallic leaf is applied and to impress the leaf by means of relief dies under relatively high pressure. Such application involves a number of separate operations. The leaf is first caused to adhere to the surface so that it covers entirely the space in which the title or decoration is to appear. The surface is passed through the press where the leaf is subjected to pressure by the die. The surface must then be brushed to remove the surplus leaf, and if this is of value, as when gold leaf is used, the fine particles must be recovered. Because of the cost of the leaf, the unavoidable waste and the complicated operations involved, the application of titles and decorations to bindings and the like in the manner described is relatively expensive.

It is the object of the present invention to provide a method of applying titles and decorations to bindings and the like, using metallic pigment inks as the medium of application and thus avoiding the several operations and the waste incident to the use of metallic leaf.

Further objects and advantages of the invention will be apparent as it is better understood by reference to the following specification in which the preferred embodiment of the invention is described.

I have discovered that metallic pigment inks may be successfully employed in stamping book-bindings and the like provided the plate die or type employed in the stamping operation is heated to and maintained at a suitable temperature during the printing or stamping operation. By applying heat to the printing plate in this manner the ink is caused to dry rapidly so that a clean impression is obtained which does not become blurred either in the printing or stamping operation or subsequently in the handling of the bindings. Furthermore, the rapid drying of the ink insures a smooth, hard and glossy finish on the pigment, which brings out the color and materially adds to the decorative quality of the product. The use of heat also obviates the necessity of preliminary blanking impressions in the treatment of cloth and leather having a distinct pattern or grain.

In carrying out the invention, it is desirable to utilize an ink which is capable of drying without becoming gummy and of a consistency such as to permit transference of the ink through the printing rolls to the printing plate. It is desirable, moreover, that the vehicle employed in the ink be such as to protect the pigment from oxidation and consequent discoloration. Such an ink is disclosed in the copending application of Howard Waters Doughty, Serial No. 521,169, and consists, in accordance with the disclosure in that application, of a metallic pigment suspended in a vehicle which comprises a resinous substance and a high boiling hydrocarbon derivative as a solvent for the resinous substance. In its preferred embodiment, the vehicle consists of ordinary rosin dissolved in terpineol or a solvent containing terpineol in the proportion of seven parts by weight of terpineol to two parts of ordinary rosin. The proportions of the ingredients of the solvent may vary widely as may also the particular ingredients employed. The metallic pigment, which may be, for example, a bronze powder in finely divided condition, is mixed with the vehicle in proportions to produce an ink of the desired consistency, for example, in equal proportions by weight or in the proportion of two parts by weight of the pigment to one part by weight of the vehicle. These proportions may also vary depending upon the

particular characteristics of the vehicle and pigment employed. No claim is made herein to the ink or vehicle, this being the subject matter of the copending application referred to, and it is to be understood, moreover, that the present invention is not limited to the use of the specific ink mentioned, this being merely by way of illustration of the preferred embodiment of the invention.

I have discovered that the best results are obtained when the ink above described is transferred to the binding or other surface by a printing plate which is preferably heated to a temperature sufficient to dry the ink during the impression interval. A temperature of approximately 140° F. is satisfactory with the particular ink described. The temperature of the plate may vary considerably, depending upon the composition of the ink, without materially affecting the results obtained. It is preferably maintained at a substantially uniform temperature, and this may be readily accomplished by the use of electric heating elements arranged behind the plate in heat-transmitting relation thereto.

In carrying out the invention a printing press of the ordinary swinging platen type or an upright stamping or embossing press with an inking attachment may be employed. The heated printing or stamping plate die or type is supported on the bed of the press, and the heating elements therein are connected to a source of electric current whereby the desired temperature is maintained. The ink is preferably applied by inking rollers which are not affected by the heat. Rollers of vulcanized oil or rubber are satisfactory for this purpose. The rollers are fed from a suitable fountain plate or roll regulated to supply ink as required to the inking rolls. The inking rolls travel over the printing or stamping plate between each impression applying ink thereto. The ink is immediately transferred to the binding which is disposed by the operator upon the swinging platen. Because of the temperature of the plate, the ink is substantially dry before the pressure is released. The operation involved is thus quite as simple as any ordinary printing operation, the titles and decorations being complete when the surface is withdrawn from the press by the operator following the impression. Of course, the bindings may remain in the press for one or more impressions as desired, but in ordinary work it is sufficient to apply a single impression.

In order that the invention may be clearly understood, I have shown in the accompanying drawing the means whereby it may be carried out, it being understood, however, that the invention is not limited to the particular apparatus disclosed, nor, in fact, to any special mechanisms or devices. In the drawing,

Fig. 1 illustrates in vertical section a printing press suitable for use in stamping book bindings;

Fig. 2 is a plan view partially in section of the printing plate and heating means therefor;

Fig. 3 is an enlarged sectional view on the line 3—3 of Fig. 2; and

Fig. 4 is a reduced sectional view on the line 4—4 of Fig. 2.

Referring to the drawing, 1 indicates the frame of the press which is provided with a bed 2 to receive the heated plate 3. The latter comprises a base 4 to which a printing plate 5 may be secured, and cover plate 6. Heating elements 7 are supported within the base 4 and are connected by conductors 8 to a source of current. The heating elements may be of any suitable construction, consisting, for example, of sheets 9, preferably of mica, upon which resistance conductors 10 are wound. The resistance conductors are insulated from the base 4 and cover 5 by insulators, such as sheets of mica 11. Other forms of heating elements may be used. The press is provided with a fountain roller 12 to which the ink may be applied, and inking rollers 13 travel as is usual in printing presses between the fountain roller and the printing plate, thus serving to transfer the ink after each impression to the printing plate.

A swinging platen 14, adapted to be actuated in the usual manner, is provided, and the binding or other surface 15 to be stamped is placed upon the platen as the latter swings downwardly. The binding is then carried upwardly into contact with the printing plate to receive the impression, after which the platen returns and the binding is removed by the operator.

From the foregoing, it will be understood that I have devised a novel method of stamping surfaces such as book-bindings, labels, hat-bands and the like. By the application of this method the tedious process of stamping involving the use of metallic leaf is entirely avoided; the time required to complete the stamping is materially reduced and waste of material, which is unavoidable in the use of metallic leaf, is eliminated. The invention is particularly adapted to the preparation of bindings in large editions where frequently the cost of binding must be reduced to a minimum. Bindings prepared in accordance with the invention closely resemble those prepared by the application of metal leaf, and, in fact, can hardly be distinguished if the pigment employed in the ink is in a sufficiently finely divided condition.

Various changes may be made in the de-

tails of the operation without departing from the invention or sacrificing any of the advantages thereof.

I claim:

A method of stamping which comprises transferring a metallic pigment ink containing a solvent which is not volatile at atmospheric temperatures by pressure to a surface and drying the ink on the surface during the impression interval by the application of sufficient heat to ensure volatilization of the solvent.

In testimony whereof I affix my signature.

SIDNEY SATENSTEIN.

Plaintiff's Exhibit 49 for Identification.

Distillation Range of 1922 Kerosene.

First drop	175°C
5%	191.5
10	197
20	203
30	210
40	216.5
50	224
60	233
70	245
80	268
90	307
95	324
End Point	329

Plaintiff's Exhibit 52.

Distillation Range of Defendant's Kerosene.

First drop	174°C
5%	191.5
10	197.3
20	209
30	215.3
40	220.5
50	226
60	230.7
70	236.8
80	244
90	255
95	264
End Point	270

Plaintiff's Exhibit 53.

Comparison of Formulas.

INK VEHICLE

(For Yellow, D. Ex. G-2; Red, D. Ex. H-2; Black, D. Ex. J-2)

McElroy Patent p. 2, ll. 16-27			Carroll Formulae D. Ex. F-2
Terpineol	79.8	14.3	Terpineol
Rosin oil	4.2	28.6	Pale second run rosin oil
Powdered Cumar	16.	57.1	Cumar P25 [viscous]
	100.0	100.0	

VEHICHLE FOR BLUE INK

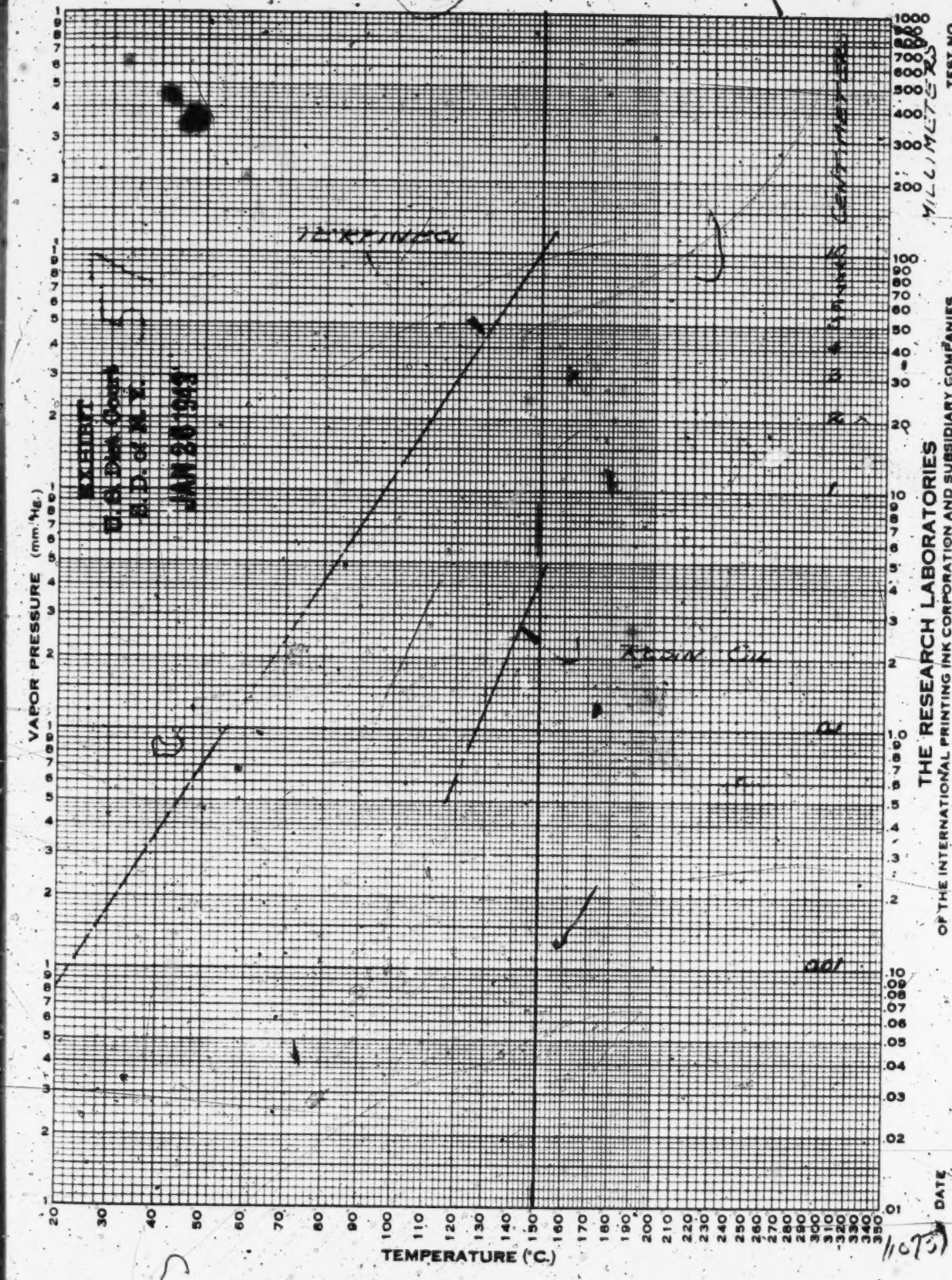
McElroy Patent p. 2, ll. 16-27			Carroll Formulae D. Exs. F-2, J-2
Terpineol	79.8	15.7	Terpineol
Rosin oil	4.2	29.5	Pale second run rosin oil
Powdered Cumar	16.	54.8	Cumar P25 [viscous]
	100.0	100.0	

Plaintiff's Exhibit 57.

Chart.

(*Opposite* ☞)

Exhibit 57 (12)



Plaintiff's Exhibit 59.

The following is a breakdown of the Jirousek Patent U. S. No. 1,954,627 into the essentjal ingredients on 100% basis:

Pigment		23.6%
Solvent		21.2%
Benzyl Alcohol	8.4%	
Mineral Spirits	9.3%	
Kerosene	3.5%	
Resin		1.6%
Copal	1.6%	
Kauri	Trace	
Solid		2.4%
Paraffin Wax	1.6%	
Petrolatum	.8%	
Liquid		51.2%
Rosin Oil	1.7%	
Drier	9.4%	
Cobalt Drier	2.6%	
Vegetable Drier	6.8%	
Linseed Oil	40.1%	

Plaintiff's Exhibit 63.

Zinsser & Co., Inc.
Manufacturing Chemists
Hastings-on-Hudson, N. Y.

February 17, 1932

Mr. H. Finne
Cray-Finne Company, Inc.
310 East 22nd Street
New York City

My dear Mr. Finne:—

I have sent you a package containing a tin can full of dispersed Chrome Yellow Medium in the proportion of 10 parts of Chrome Yellow Medium to two parts of a mixture consisting of equal parts of Blown Castor Oil and Di Butyl Phthalate. A second tin can contains a special varnish made for you according to our original sample, 842-C-V.

The original sample given you was an ink made of this Yellow and this varnish. In this case we prefer to give you the Yellow and the varnish separately. If you will grind 10 parts of the Yellow and 7½ parts of the varnish, you will obtain the same consistency and the same ink as the original sample, 842-C-V.

In the package is also enclosed a bottle of special thinner. Should you find your ink or your varnish too heavy, use this thinner according to your own judgment.

Should you have any trouble with these materials, please call me up and I will give you all the assistance I am able to to solve this problem.

With kindest personal regards, I am,

Very truly yours,

A. E. Gessler

A. E. Gessler M. F.

AEG:MF

Plaintiff's Exhibit 64.

April 4, 1932.

Amendment to Description of July 8, 1930.

The present invention relates to Printing Inks in which the oxidizing oil of the ordinary type of Printing Ink is replaced by a mixture of plasticizers and Nitrocellulose or gum solutions in such a way that the end product can be used on the printing press without drying on the rollers, but yet will dry in the prints.

Heretofore Printing Inks were made by grinding pigments in oils or varnishes which had the ability to dry slowly in the air by oxidizing. This process of oxidizing is unsatisfactory for many purposes because the drying of the print is too slow causing trouble thereby, extra operations and delay on high speed printing presses and also because the dry film remains soft for a long time and does not protect the pigment sufficiently against rubbing or moisture or chemical influences, possesses a disagreeable odor and other unsatisfactory qualities.

I have discovered that by grinding or dispersing pigments in plasticizers and oils, or both, and by mixing these dispersions with solutions of Nitrocellulose or gums in organic solvents possessing a vapor pressure as low or lower than a few tenths of one millimeter of Mercury at 20° C, but yet volatile enough to evaporate quickly from the thin layer of the print if exposed to heat, a very satisfactory ink can be obtained. The drying of this ink is slow enough so that it does not harden or thicken on the printing rollers, but notwithstanding this, will dry quick enough if exposed to heat after being printed, by the evaporation of the solvents out of the very thin layer, leaving a very flexible film in which the pigment is much better protected against rubbing or moisture or chemical influences and which possesses practically no odor.

Inks of this character have not been considered possible or practical so far, since the formulae used in the lacquer industry are not suitable at all on account of the high volatility of the solvents employed. Such inks would dry very

Plaintiff's Exhibit 64.

quickly on the printing rollers and make continuous printing impossible. Experiments have been made to remedy this, but the essential point was not understood, namely, that such solvents must be used which possess low vapor pressures of less than a few tenths of one millimeter of Mercury at ordinary temperature but yet are volatile enough to evaporate quickly from the thin film of the print if exposed to heat for a short time.

I give the following example as an illustration of one method of applying the invention: 100 parts of Chrome Yellow are ground or chemically dispersed in a mixture of 10 parts of Blown Castor Oil and 10 parts of Di Butyl Phthalate. The obtained semi-soft product is then mixed or ground with a solution of 35 parts of Nitrocellulose in 55 parts of Diethylene Glycol Butylether. The resulting product is a Printing Ink of excellent printing quality, practically non-drying on the roller but yet drying out from the thin film of the print within a few seconds if exposed to heat, as for instance, by passing over a steam heated roller.

What I claim is: As a new article of commerce a Printing Ink consisting of a pigment or pigments, ground or dispersed in oils or other plasticizers, in mixture with solutions of Nitrocellulose and or gums in solvents possessing vapor pressures of a few tenths of one millimeter Mercury at 20° but yet quickly volatilizing out of the thin layer of the print if exposed to heat for a short time.

County of Westchester, } ALBERT E. GESSLER.
State of New York. }

Subscribed and sworn to before me
this 9th day of April, 1932.

R. A. Neely
Notary Public (Seal)
Westchester Co., N. Y.
My Commission Expires
March 30, 1934

Plaintiff's Exhibit 65.

Description of July 8, 1930.

The present invention relates to Inks for paper, tin, and calico printing, etc., in which the oxidizing oil of the ordinary printing ink is replaced by a mixture of plasticisers and nitrocellulose or gum solutions in such a way that the end product can be used on the printing press without drying on the rollers, but yet will dry in the prints.

Heretofore printing inks were made by grinding pigments in oils or varnishes which dried slowly on the air by oxidizing. This process of oxidizing is naturally a slow one and is unsatisfactory for many purposes because the dry film remains soft for a long time and does not protect the pigment sufficiently against rubbing or moisture or chemical influences and possesses a disagreeable odor and other unsatisfactory qualities.

I have discovered that by grinding or dispersing pigments in plasticisers and oils, or both, and by mixing these dispersions with thick solutions of nitrocellulose or gums in organic solvents of a very low vapor pressure, preferably less than 1 mm Hg at 20° C, but yet still volatile at ordinary temperature, a very satisfactory Ink can be obtained whose drying is slow enough that it does not harden or thicken on the printing rollers, but notwithstanding will dry quick enough when printed on paper or tin or textiles by the evaporation of the solvents out of the very thin layer, leaving a very flexible film in which the pigment is much better protected to rubbing or moisture or chemical influences and which possesses practically no odor.

Inks of this character have not been considered possible or practical so far, since the mixtures used in the lacquer industry are not suitable at all on account of the high volatility of the solvents employed. Such inks will dry very quickly on the printing rollers and make continuous printing impossible. Experiments have been made to remedy this but the essential point was not understood that solvents must be used which possess the low evaporation of less than

Plaintiff's Exhibit 65.

1 mm Hg vapor pressure at ordinary temperature, but yet are volatile enough to evaporate in a reasonable time if spread in the thin film of a print.

I give the following example as illustration of one method of applying the invention.

100 parts of Chrome Yellow are ground or chemically dispersed in a mixture of 10 parts of Blown Castor Oil and 10 parts of Di Butyl Phthallate. The obtained semi soft product is then mixed or ground with a solution of 35 parts of ¼ second nitro cellulose in 55 parts of Butylcarbitol. The resulting product is a printing ink of excellent printing qualities, practically none drying on the roller but drying on paper within an hour.

What I claim is: As a new article of commerce a printing ink consisting of a pigment or pigments ground or dispersed in oils or other plasticisers, in mixture with solutions of nitro cellulose or gums in solvents possessing vapor pressure of less than 1 mm Hg 20° C, but yet still volatile at ordinary temperature.

A. GESSLER

(SEAL)

July 8 1930.

Witness as to signature
July 8th 1930

FRED J. CONGLETON

Defendant's Exhibit B.

Mr. Frank W. Cray, President
Cray-Finne Company
310 East 22nd Street
New York City

Dear Mr. Cray:

On March 26, 1934, we received 386 pounds of 9816 ink. The sample lot of this ink run previously appeared to work satisfactorily. However, when we attempted to run this shipment it dried on the rollers and could not be used.

We returned 364 pounds on April 17th at your request in order that you could make the necessary adjustments to permit our running the ink.

On April 24th you returned 391 pounds and we put it on press yesterday. At 3500 we cracked one set of rollers; we put in a new set and at 35,000 this set cracked on us.

Inasmuch as we all agreed that we should not proceed with further experiments on this type of ink, it will perhaps be better for us to return the balance of this ink to you as you previously suggested that you could put it to other use. If this is satisfactory to you, will you please issue the necessary credit.

Very truly yours,

Assistant to Superintendent

May first
1 9 3 4
AES:A

Returned 372 lbs on May 3rd.

Defendant's Exhibit C.

Gessler U. S. Patent No. 2,128,672.

(*Opposite* ☞)

Patented Aug. 30, 1938 2,128,672

UNITED STATES PATENT OFFICE

2,128,672

PRINTING INK

Albert E. Geigler, Yonkers, N. Y., assignor, by mesne assignments, to Interchemical Corporation, Cincinnati, Ohio, a corporation of Ohio

No Drawing. Application March 17, 1934, Serial No. 716,178

1 Claim. (Cl. 134—35)

In my co-pending application Serial No. 622,453, filed July 14, 1932, Patent No. 2,087,190, issued July 13, 1937, I have described and claimed a printing ink, unusual characteristics and adaptabilities comprising a coloring material incorporated in a vehicle which is practically non-volatile at approximately room temperatures but which is highly volatile, or whose vapor pressure increases very rapidly, at elevated temperatures. The preferred vehicles described and claimed in the aforementioned application are those containing solvents which possess physical properties like those characteristic of diethylene gycol monobutyl ether, which not only impart to the ink superior printing qualities but which, when the prints are subjected to heat, cause them to dry almost instantaneously.

Such vehicles as are above described have the advantage that they may be formed into inks which can be handled with facility and which are so free from highly volatile solvents that they do not dry at room temperatures or on the printing plates or in the fountain of the press, but which will dry so quickly when subjected to elevated temperatures that prints made from them are dry as soon as they have passed through the drying apparatus at the delivery end of the printing machine on which they are used. This, of course, results in large savings in time, labor, power and equipment as it enables the prints to be printed immediately on the reverse side and to be packed and shipped without the necessity of the storing and drying operations usually required after the prints have been made. Successive sheets of material will not offset or stick together because each ink film dries practically instantaneously. Thus, there can be no smudging due to the wetness of the print.

The superior printing qualities of inks formed from such vehicles are undoubtedly due to the excellent characteristics of viscosity, tack, covering power, resistance to absorption, etc., which are imparted to the inks by the solvents and other materials used. These enable less ink to be used for a given coverage than is the case with ordinary ink, due to the fact that the ink is non-absorbent, and cause the elimination of "halo", which is a term used in the printing industry to characterize the tendency of an ink to move outwardly from the point at which it has been applied, and thus form irregular markings upon the surface printed upon.

Many printing presses, and especially those used for fine printing, are equipped with a very sensitive type of ink-distributing rollers, carrying the ink from the fountain to the printing plates and consisting generally of mixtures of glue, glycerine and water or similar materials. If these rollers are used with the printing ink of my said co-pending application, they are subject to deterioration by reason of the tendency of the ink to extract some of their constituent substances. This is explained by the fact that the solvents used in the preparation of the ink are miscible with water and/or gylcerine or glycerine substitutes, and during their use with such ink-distributing rollers a slow extraction or exchange of these substances from the roller material takes place and the rollers eventually are rendered hard and inelastic and unable to carry and distribute the ink evenly and satisfactorily over the printing plates.

It will be apparent that the full benefits and advantages of the printing ink described and claimed in my aforesaid application cannot be availed of on presses equipped with ink-bearing rollers of the type referred to. It is, therefore, an object of the present invention to prepare an ink which is adapted for use with rollers made from glue, water and glycerine or similar mixtures.

With ink-bearing rollers of this type, therefore, I have found it advantageous to use an ink which will not extract substances from them, particularly water, glycerine, or its substitutes. In order to assure this, it is important that the solvents employed in the ink should be such that they inherently have a limited affinity for water, glycerine or glycerine substitutes. Then by small additions of these substances, the remaining demands of the ink for them may be satisfied. With such an ink substantially no water or glycerine will be taken up from the rollers. The amount of such additions should, however, not be so great as to disturb the printing qualities of the ink nor will such excess addition be necessary where the proper solvent is employed.

I have found that certain organic esters possess these desirable qualities, and are quite satisfactory for use as solvents in vehicles for the printing inks required for such ink-bearing rollers or contact bodies as are above described. For instance, diethylene glycol monobutyl ether, which is a solvent particularly well adapted to dissolve certain low viscosity cellulose compounds such as nitrocellulose, or natural or synthetic resins, if converted into its esters—for example, its acetate—will have these qualities, yet the resultant compound possesses vapor pressure and other desirable characteristics very similar to those pos-

sessed by the original ether, and enables the same great advantages to be obtained when used as a solvent in the preparation of a printing ink.

It should be understood that for the purposes of the present invention, all those solvents of soluble cellulose compounds and resins are included which have similar chemical and physical properties as the above described ester.

It should be noted that the water, glycerine, etc., or mixtures of substances which when extracted from a roller of the type described will render it unfit for use, is in amount relatively small as compared with the total composition of the roller, and the deleterious effect is apparently due to the removal of these substances at the surface. Consequently, if the ink possesses even a slight affinity for these substances they will be slowly extracted from the surface of the rollers and a gradual hardening of the rollers will take place. It will be seen, therefore, that the ideal condition to be obtained is one wherein there is an exact balance between the desire of the ink to take up these substances and the amount thereof which are supplied to satisfy this desire.

Inks containing organic solvents of this character have the same qualities and novel features in general as the inks described and claimed in application Serial No. 622,453, improved by the additional quality and feature of not attacking and unduly destroying the sensitive ink-bearing rollers of the type referred to.

As a specific example of the preparation of my novel ink, the following is given:

35 parts of low viscosity nitrocellulose are dissolved in 55 parts of monobutyl ether of diethylene glycol acetate and 10 parts of dibutyl phthalate. This solution may be heated to drive off impurities, and a small amount, say 1%, of water and glycerine added. The ink is then prepared by grinding or otherwise dispersing a pigment, such as 100 parts of chrome yellow, in the solution. It will, of course, be recognised that the yellow pigment may be replaced by any suitable pigments or dyestuffs and/or mixtures thereof; that the binder, nitrocellulose, may be replaced by other binders, such as other cellulose compounds and/or mixtures thereof and/or by natural or synthetic resins. Moreover, the dibutyl phthalate may be replaced by any other suitable agent, such as tricresyl phosphate or the like, effective to prevent brittleness in the finished product and to repress the vapor pressure of the solvent media at room temperatures. If desired, 10 parts of castor oil may be added to the vehicle in order to give softness and flexibility to the ink coating. The monobutyl ether of diethylene glycol acetate may be replaced by other solvents, or solvent mixtures, possessing a similarly low rate of evaporation at ordinary temperature and a marked acceleration of the volatility at raised temperatures, and possessing a similar substantial lack of affinity for water and/or glycerine, or glycerine substitutes.

One important property of diethylene glycol monobutyl ether acetate is its vapor pressure characteristic. The vapor pressure of this solvent at 20° C. is similar to, and even less than, that of diethylene glycol monobutyl ether, the solvent specified in applicant's first application (that is to say, it is less than 0.02 mm. of mercury, according to Brewer and Gardner, Industrial and Engineering Chemistry, vol. 29, No. 2, p. 179, February, 1937), and its vapor pressure at 150° C. approximates the vapor pressure of ethyl alcohol at ordinary temperatures (about 40.0 mm. of mercury). This vapor pressure at elevated temperatures contrasts sharply with the vapor pressures of high boiling "plasticizers" such as dibutyl phthalate, a minor proportion of which is used in the specific example. The vapor pressure of this liquid (according to Brewer and Gardner) is 0.45 mm. at 100° C. and 1.4 mm. at 150° C.

Another important property of diethylene glycol monobutyl ether acetate is its substantial lack of affinity for water and glycerine, which distinguishes it not only from hygroscopic organic solvents, but also from those which, while not truly hygroscopic, are water-miscible. Otherwise, the present ink is similar to the ink of my co-pending patent referred to above. It has the consistency of ordinary oil varnish printing ink, is stable on the press, and yet dries instantly when heated following the printing operation.

It will be seen that an ink made in accordance with the principles hereinbefore set forth is distinctly superior to the ordinary types of inks made by grinding pigments in the usual types of oils or oil varnishes. Such oils or varnishes are characterized by their relatively slow rate of drying due to polymerisation, oxidation and/or absorption and as a consequence cause considerable difficulty in printing processes by delaying the speed of operation.

It will also be noted that the quick drying ink of the present invention is distinct from and superior to the ordinary type of oil ink in which the driers or drying accelerators are incorporated, as the usual accelerating means are not sufficiently rapid in accomplishing the desired result of instantaneous drying. The ink of the present invention, moreover, is not to be confused with lacquers as the latter have the predominant characteristic of high volatility at room temperatures (due to the highly volatile solvents employed) as contrasted with the substantially non-drying nature of my novel ink at room temperatures; and such lacquers also lack the qualities of tack and viscosity, characteristic of printing ink, possessed by my ink, because they employ solutions of relatively low solids concentration as contrasted with the relatively high solids concentration of my ink.

It will be noted further that substances like dibutyl phthalate referred to in the above example, are desirable not only because of their capacity for dissolving cellulose compounds but also because of their tendency to prevent the brittleness characteristic of a film consisting of nitrocellulose or resins alone. This type of solvent possesses a very low vapor pressure over a wide range of temperature and is practically non-volatile if exposed to the heat necessary for the process. It will be seen, therefore, that this type of solvent is desirable as an aid to plasticising the film obtained after the main solvent has evaporated. Furthermore, as above indicated, such solvents have a negligible vapor pressure at ordinary temperatures and at the same time exert a repressing action on the other solvents and may be admixed with such other solvents in order to reduce or repress the normal vapor pressures of such other solvents at room temperature. Thus, the dibutyl phthalate referred to in the example as illustrative, or other plasticisers such as tricresyl phosphate, triacetine, castor oil or the like, will be seen to be of considerable importance by reason of the fact that their characteristically low vapor pressures at ordinary temperature (these solvents have no appreciable vapor pressure at room temperature) make them admirably suited for intermixture

in proper proportions with solvents whose vapor pressures at room temperature may be somewhat higher than would ordinarily qualify them for use alone as solvents in my novel printing ink; and the rate of evaporation of the mixture may thus be regulated so that it falls within the preferred range indicated.

By "room temperatures" as used in this specification, I mean the ordinary or normal temperatures of a room in which people live and work. This is generally agreed to be temperatures from approximately 20° C. to approximately 25° C.

With ink prepared as above, the printing operation may be carried out in the ordinary manner and at ordinary temperatures. At the conclusion of the printing operation, the printed materials may be subjected, by means of suitable drying equipment, to sufficient heat to dry the thin film of the print very rapidly. Thus, a finished print is obtained immediately at the end of the printing and heating operation and no time, labor, nor material is wasted in delays incident to the prolonged drying of the printed goods under the processes at present in use. Coating the prints with paraffin or similar compounds, in order to enable them to be immediately printed on their reverse side, and the disadvantages concomitant therewith, are eliminated by the process of this invention.

The novel ink and process described above are not only capable of utilization in printing upon paper, but they are also adapted for use in making very satisfactory prints upon many other surfaces, such as, for instance, textiles or metallic surfaces, or the lacquered surfaces of Cellophane, or the like.

It is apparent that such an ink as has been described does not necessitate the admixture of driers, does not set or harden on the printing rollers or plates, but is yet capable of being dried very quickly when subjected to suitable temperatures after being printed, by the evaporation of the solvent from the thin layer of the print. The finished products are flexible prints in which the pigment is well protected against being rubbed off. They are not softened by moisture, grease, or most chemical influences and possess practically no odor.

What I claim is:

A printing ink adapted for printing presses having rollers of the glue, glycerine and water type, which is substantially non-drying on the press at ordinary temperatures and dries rapidly at 150° C., consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component—being a member of the group consisting of natural and synthetic resins and cellulose compounds—dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary printing ink, in which the major part of the liquid component is diethylene glycol monobutyl ether acetate.

ALBERT E. GESSLER.

Defendant's Exhibit E.

File History of Patent No. 2,087,190

(Opposite ☞)

Defendant's Exhibit E.

DEPARTMENT OF COMMERCE
UNITED STATES PATENT OFFICE

To all persons to whom these presents shall come, Greeting:

THIS IS TO CERTIFY that the annexed is a true copy from the records of this office of the File Wrapper and Contents, in the matter of the

Letters Patent of
Albert E. Cessler, assignor,
by mesne assignments, to
The International Printing Ink Corporation,

Number 2,087,190, Granted July 13, 1937,

for

Improvement in Printing Inks.

IN TESTIMONY WHEREOF I have hereunto set my hand and caused the seal of the Patent Office to be affixed at the City of Washington, this eighth day of August, in the year of our Lord one thousand nine hundred and forty-one and of the Independence of the United States of America the one hundred and sixty-sixth.

ATTEST:

Chief of Division.

Commissioner of Patents.

Defendant's Exhibit E.

PATENTED FILE
RETURN TO RECORD ROOM
022453

PATENT No. 2087190

DATED JUL 13 1937

DIV. 50 64

(EX'R'S BOOK) 76-9

Name ALBERT E. GESSLER

by mesne assigns
[illegible] Ernser & Company, Inc. of
[illegible] Hudson, [illegible]
[illegible] The International Printing Ink Corporation
of New York, N.Y., a Corp. of Ohio.

of YONKERS [illegible]

State of NEW YORK

Invention

~~PRINTING INK AND METHOD OF UTILIZING SAME~~

SPECIAL
CASE PENDING OVER
3 YEARS

ORIGINAL		RENEWED	
APPLICATION FILED COMPLETE	JULY 14, 1932		APR 11 1936
Petition, Specification, Oath, First Fee $25, sheets Drawings	JULY 14, 1932	$30.	APR 11 1936

Examined and passed for Issue [illegible], 1935
[illegible] Exr. Div. 64
Notice of Allowance ..., 193
By Commissioner
Final Fee ..., 193

Reexam'd and passed for Issue June 3, 193
[illegible] Exr. Div. 64
Notice of Allowance JUN 1937, 193
By Commissioner
Final Fee $30 June 17, 193

Attorney CHARLES J. HOLLAND 420 LEXINGTON AVE NEW YORK N.Y.
Robert W. Byerly 225 Broadway
Associate Attorney Charles J. Holland, 420 [illegible]

No. of Claims Allowed [illegible] Print Claims [illegible] in O. G. Class 134-36

Title as Allowed Printing Ink

Division of App., No.

Defendant's Exhibit E.

JUL 14 32

MAIL DIVISION
JUL 14 32
PATENT OFFICE

GRAYBAR BUILDING
EASTERN CONCOURSE-GRAND CENTRAL TERMINAL
NEW YORK CITY

July 13,1932.

Hon. Commissioner of Patents,
Washington, D. C.

S i r : -

Enclosed please find application of Albert E. Gessler for patent for Printing Ink and Method of Utilizing Same, comprising petition with power of attorney, specification and claims, oath, and check for $25 Government filing fee.

Please file this application in the Patent Office and act on the merits of same in due course.

Respectfully,

Charles J. Holland

M

622453

Defendant's Exhibit E.

MAIL DIVISION
JUL 14 32

622453

B 22

PETITION.

TO THE COMMISSIONER OF PATENTS:

Your petitioner, ALBERT E. GESSLER, a citizen of the United States, residing in the City of Yonkers, County of Westchester and State of New York, whose post-office address is No. 8 Hillcrest Avenue, Yonkers, N. Y., prays that Letters Patent may be granted to him as sole inventor for Improvements in PRINTING INK AND METHOD OF UTILIZING SAME set forth in the annexed specification; and he hereby appoints CHARLES J. HOLLAND, Reg. No. 11,545, of No. 420 Lexington Avenue, New York, N.Y., his attorney, with full power of substitution and revocation, to prosecute this application, to make alterations and amendments therein, to receive the patent and to transact all business in the Patent Office connected therewith.

Signed at the City, County and State of New York, this 25th day of June, 1932.

Albert E Gessler

SPECIFICATION.

TO ALL WHOM IT MAY CONCERN:

BE IT KNOWN that I, ALBERT E. GESSLER, a citizen of the United States, residing at Yonkers in the County of Westchester, State of New York, have invented certain new and useful improvements in PRINTING INK and METHOD OF UTILIZING SAME, of which the following is a full, clear and exact specification:

1/2

622453

Defendant's Exhibit E.

The present invention relates to printing inks and has for an object the preparation of a novel type of printing ink, which possesses many advantages over the printing inks heretofore known and overcomes many of the disadvantages associated with the procedure which it has been necessary to use in order that such inks may be properly applied to produce a satisfactory print.

Heretofore, printing inks have in general been made by grinding pigments in oils or oil-varnishes, or both. Such oils or varnishes have been characterized by their relatively slow rate of drying, due to polymerization, oxidation and/or absorption and, as a consequence, have presented great difficulty in printing processes by greatly delaying the speed of operation. This has not only necessitated the expense and maintenance of large and cumbersome auxiliary equipment and extra labor, but has also resulted in a dependency of the printing process upon the time required to obtain a complete drying.

In order to overcome these difficulties, it has been customary to incorporate in the inks varying amounts of driers which have the ability to accelerate the speed of the oxidation and/or polymerization of the oil varnishes. However, even with all possible acceleration, the drying of the prints takes many hours or even days, necessitating in addition to the great delay in time, extra labor to remove, to store, and to return to the machines the printed material and also in many cases a great waste of paper in the form of slip-sheets which must be rolled up or stacked between the prints in order to avoid offsetting, rubbing off, smudging or sticking together.

It has also been proposed to use various types of lacquers in printing processes, particularly cellulose lacquers. As is well known, the cellulose solvents used in these lacquers are characterized by a high degree of volatility. Indeed, this characteristic is considered an advantage in lacquers, for in the ordinary use to which lacquers are put,

rapid drying or hardening is highly desirable. However, it is obvious that such rapid drying inks made on this principle unsuitable for printing from plates or rollers; for, while they may be applied to printing plates or rollers, they will quickly dry and harden thereon and they will have only the effect of yielding dry or half dry material to the printing form from which, therefore, no satisfactory impression can be made on the material to be printed.

I have discovered, however, that if in contrast to the above, cellulose compounds, particularly nitrocellulose, are dissolved in solvents with high boiling points, this difficulty may be avoided. Naturally, if the solvents are too slow in evaporating, the same difficulties, which occur in the case of ordinary oil varnish inks, are encountered. In this respect I have found that certain such high boiling solvents, very well adapted to dissolve cellulose compounds, have at room temperature such slow drying properties that, while they may be employed as solvents in this ink, and while an excellent impression may be transferred to the surface to be printed upon, the impression will nevertheless be so moist that it is likely to become blurred or smudged by rubbing after many hours or even days. This defect, however, may be remedied by the present invention, which involves a recognition of the principle that some of these high boiling solvents exhibit, at elevated temperatures, such a remarkable and quick increase in their vapor pressure that they volatilize rapidly, while others show little change in their vapor pressures and therefore are practically non-volatile.

As above indicated, the present invention makes use of the characteristics of these solvents having high boiling points and high vapor pressures at elevated temperatures.

The referred to solutions, in contradistinction to lacquer solutions which require highly volatile solvents, are characterized by their very low rate of evaporation at temperatures approximating room temperature and by their ability to manifest a relatively high degree of

B 2263

Defendant's Exhibit E.

volatility when subjected to temperatures higher than room temperature. The solvents or solvent mixtures utilized in the formation of these solutions may be described as solvents having a high boiling point combined with a low vapor pressure ~~of the order of about one millimeter or less of mercury~~ at room temperature, but yet further characterized by a rapid rise in their vapor pressure curves upon elevation of the temperature, -- that is, by their property of evaporating quickly from a thin layer, as in a print, when the temperature is sufficiently raised. Among this peculiar class of solvents I have found as an example diethylene glycol monobutyl ether to be a solvent for nitrocellulose and many natural and artificial gums, very well adapted to the purposes of this invention. This solvent at room temperatures remains fluid and moist for a long period of time. When heated to about 100° C. or above, the rate of vaporization is greatly accelerated and, when used in the ink of this invention, produces a print which dries almost instantaneously when subjected to such a heat treatment.

The printing ink above briefly described may be further admixed with varying amounts of another and different class of oils or high boiling solvents possessing a very low vapor pressure over a wide range of temperatures, so that they are practically non-volatile if exposed to the heat necessary for the process. This admixture acts as a plasticizer and tends to prevent the brittle characteristic of a film consisting of nitrocellulose or gums alone.

The following specific example is illustrative of my invention as applied to the production of a yellow printing ink particularly. The ink may be made up as follows: 100 parts of chrome yellow, 35 parts of nitrocellulose (low viscosity), 55 parts of diethylene glycol ~~butylether~~, 10 parts of dibutylphthalate, and 10 parts of blown castor oil.

The above composition may, for example, be prepared by grinding or otherwise dispersing the pigment in a solution of the nitrocellulose in diethylene glycol monobutyl ether. The two other ingredients may

Defendant's Exhibit E. B 2247

be introduced in such order as may be expedient. It will, of course, be recognized that the yellow pigment may be replaced by any suitable pigments or dyestuffs and/or mixtures thereof; that the nitrocellulose may be replaced by other cellulose compounds and/or by natural or synthetic resins. Moreover, the dibutylphthalate may be replaced by any other suitable agent, effective to prevent brittleness in the finished product. Also, the blown castor oil which has been included in the specific formula given may be replaced by other suitable materials. Diethylene glycol butylether may be replaced by other solvents, or solvent mixtures, possessing a similarly low rate of evaporation of the order of approximately .05 millimeter of mercury or less vapor pressure at ordinary temperature and a marked acceleration of the volatility at raised temperatures. It may be desirable in some circumstances to omit the last two types of ingredients referred to in the illustrative formula, namely, those which have been added in order to offset extreme hardness and brittleness.

With ink prepared as above, the printing operation may be carried out in the ordinary manner and at ordinary temperatures. At the conclusion of the printing operation, the printed materials may be subjected, in known manner, to sufficient heat to dry the thin film of the print very rapidly. Thus a finished print is obtained immediately at the end of the printing and heating operation and no time, labor, nor material is wasted in delays incident to the prolonged drying of the printed goods under the processes at present in use.

The novel ink and process described above are not only capable of utilization in printing upon paper, but they are also adapted for use in making very satisfactory prints upon many other surfaces, such as for instance textiles or metallic surfaces, or the lacquered surfaces of cellophane, or the like, where the production of a satisfactory print has heretofore been much restricted.

Defendant's Exhibit E.

B.

It is apparent that such an ink as has been described does not necessitate the admixture of driers, does not set or harden on the printing rollers or plates, but is yet capable of being dried very quickly when subjected to suitable temperatures after being printed, by the evaporation of the solvent from the thin layer of the print. The finished products are flexible prints in which the pigment is well protected against being rubbed off. They are not softened by moisture, grease, or chemical influences and possess practically no odor. The ink adheres securely to almost every type of surface.

Defendant's Exhibit E.

B 2269

What I claim is:

1. A vehicle for coating material comprising a solution which is relatively non-volatile at approximately room temperatures but which is highly volatile at elevated temperatures.

2. A vehicle for coating material comprising a solution of nitrocellulose, said solution being relatively non-volatile at approximately room temperatures but highly volatile at elevated temperatures.

3. A vehicle for coating material comprising a solution of nitrocellulose in a solvent possessing no appreciable volatility at approximately room temperatures but being highly volatile at elevated temperatures.

4. A coating composition comprising a solution having a high boiling point combined with a relatively low vapor pressure at approximately room temperatures, but being characterized by a rapid rise in its vapor pressure curve at elevated temperatures.

5. A coating composition comprising a solution of nitrocellulose in a solvent having a high boiling point combined with a relatively low vapor pressure at approximately room temperatures, but being characterized by a rapid rise in its vapor pressure curve at elevated temperatures.

6. A coating composition comprising a coloring material incorporated in a solution of nitrocellulose in a solvent having a high boiling point combined with a relatively low vapor pressure at approximately room temperatures, but being characterized by a rapid rise in its vapor pressure curve at elevated temperatures.

7. A printing ink comprising a pigment dispersed in a solution of nitrocellulose in a solvent having a high boiling point combined with a relatively low vapor pressure at approximately room temperatures,

Defendant's Exhibit E.

but being characterised by a rapid rise in its vapor pressure curve at elevated temperatures.

8. A printing ink comprising a coloring material incorporated in a diethylene glycol butylether solution of a cellulose ester.

9. A printing ink comprising a pigment dispersed in a solution of nitrocellulose in diethylene glycol butylether.

10. A printing ink comprising a pigment dispersed in a solution of nitrocellulose in diethylene glycol butylether, said solution having plasticizing ingredients incorporated therein.

Defendant's Exhibit E.

IN WITNESS WHEREOF I have hereunto subscribed my name this 25th day of June, 1932.

Albert E Gessler

OATH.

STATE OF NEW YORK)
: SS.:
COUNTY OF NEW YORK.)

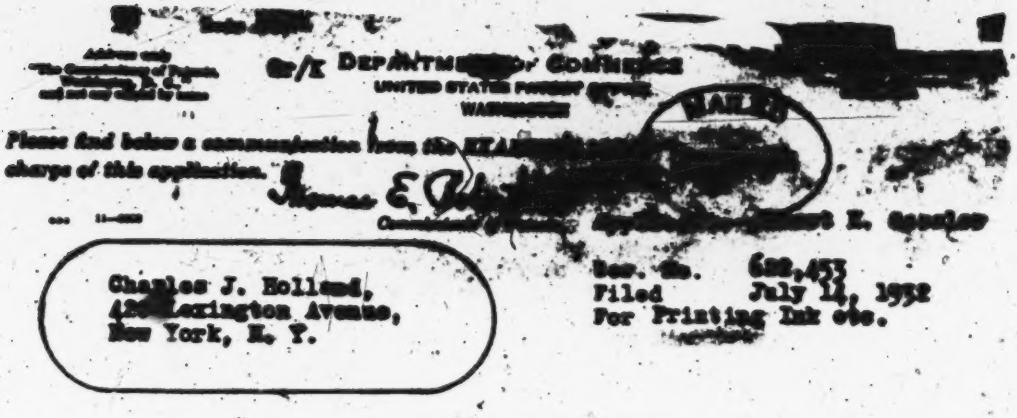
ALBERT E. GESSLER, the above named petitioner, being duly sworn, deposes and says that he is a citizen of the United States and a resident of Yonkers in the County of Westchester and State of New York that he verily believes himself to be the first, original and sole inventor of improvements in PRINTING INK AND METHOD OF UTILIZING SAME described and claimed in the annexed specification; that he does not know and does not believe that the same was ever known or used before his invention or discovery thereof, or more than two years prior to this application or in public use or on sale in the United States, for more than two years prior to this application; that said invention has not been patented in any country foreign to the United States on an application filed by him or his legal representatives or assigns, more than twelve months prior to this application; and that no application for patent on said improvements has been filed by him or his representatives or assigns in any country foreign to the United States.

Albert E Gessler

Sworn to and subscribed before me this 25 day of June 1932.

R B Schlatter

Defendant's Exhibit E.



Please find below a communication from the EXAMINER in charge of this application.

Commissioner of Patents.

Charles J. Holland,
420 Lexington Avenue,
New York, N. Y.

Ser. No. 622,453
Filed July 14, 1932
For Printing Ink etc.

References made of record:-

Dove	1,877,748	Sept.13,1932(filed 2-11-29)	134-28X
Shannon	1,880,502	Oct. 4, 1932(" 9-22-31)	134-28
Shipley et al	1,618,483	Feb. 22, 1927	134-79
Imperial, Ltd.(Br.)	360,815	Nov. 2, 1931	134-[illegible]
Middleton	1,833,086	Nov. 24, 1931	134-28
Celanese Ltd.(Br.)	296,759	July 4, 1929	134-32

Solvents- Durrans- Pub. by Chapman E. Halls, London, 1930 page 106 (Copy in Div.50)

Claims 1 and 4 are rejected as indefinite and functional.

Claims 3, 5, 6 and 7 are rejected as indefinite and functional in the use of "a solvent possessing ----- temperatures" "a solvent having a high boiling point combined with ----- temperatures".

Claims 6 and 7 are substantial duplicates. The mere difference in the preamble to the claims does not patentably distinguish them.

Claim 8 is rejected as misdescriptive. Cellulose is not soluble in diethylene glycol butylether.

Claims 1-7 are rejected as substantially anticipated by Dove, Shannon, Shipley, Middleton, or either of the British references cited above.

Claims 8-10 are rejected as unpatentable over Dove, cited above. To add nitrocellulose and a plasticizer to the composition shown by Dove would not involve invention in view of the well known use thereof in printing inks as shown in the references supra.

Claims 8-10 are further rejected as unpatentable over Shipley et al or British patent 360,815 which show compositions comprising

Defendant's Exhibit E.

688,453 -2-

a cellulose ester, a solvent for the cellulose ester (butyl ether of ethylene glycol), a pigment, and a plasticizer. To substitute diethylene glycol butyl ether for the solvent shown by Dove, Shipley et al or British patent 360,815 would not involve invention in view of the well known use and properties thereof as shown on page 106 of the publication cited above.

Claims 8-10 are also rejected as unpatentable over Shannon, Middleton or British patent 296,759 cited above. These references show it is old to incorporate a pigment or coloring material in a solution of nitrocellulose and to use such composition as an ink. In view of the well known properties of diethylene glycol monobutyl ether as a solvent for cellulose esters it would be obvious to substitute such solvent for the solvents shown in the references. Furthermore, the addition of plasticizing agents to the compositions shown by Shannon, Middleton or the British patent 296,759 would not involve invention since ink compositions containing such agents are old as shown in the references cited above.

O. Beake

Examiner.

Defendant's Exhibit E.

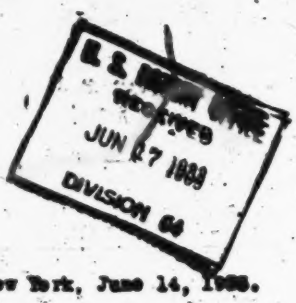
Schedules (2)

9/3

JUN 15 33

64

Div. [illegible] Room 4901
ALBERT E. [illegible]
PRINTING INK, etc.
Ser. No. 622,4[illegible]
Filed July 14, 1932.



U. S. [illegible] OFFICE
RECEIVED
JUN 27 1933
DIVISION 64

New York, June 14, 1933.

HON. COMMISSIONER OF PATENTS,
Washington, D. C.

Sir:-

Replying to Official Letter dated December 27, 1932, applicant amends as follows:

Specification, page 2 lines 19-21, cancel "This defect, however, may be remedied by the present invention, which involves a recognition of the principle" and substitute - But I have also found; line 21, insert a comma after "exhibit" and before "elevated" insert temperatures; line 22, before "temperatures" insert above room and after "temperatures" insert a comma; line 23, change the comma after "rapidly" to a period, cancel the remainder of the paragraph and substitute therefor the following: Consequently the print which is made by the use of an ink prepared with such solvents may be dried practically instantaneously upon the application of sufficient heat to cause the evaporation of these solvents.; same page line 27, insert high before "boiling" and cancel "high" before "vapor"; line 28, cancel "at elevated temperatures" and substitute which increase very rapidly upon elevation of temperature; line 30, cancel "highly volatile" and insert after "solvents" - that are highly volatile at ordinary temperatures.

Page 3 line 2, cancel "or solvent mixtures"; between lines 16 and 17 insert the following paragraph:

While I have stated that the solvents utilized in the formation of the novel printing ink are generally characterized by their high boiling points and by a vapor pressure at room temperatures which is low and of the order of about one millimeter of mercury or less, the most preferable solvents are those which have a vapor pressure considerably less

622153

than one millimeter of mercury at room temperatures, or solvent mixtures having this vapor pressure characteristic. Thus, as will be seen from the specific example hereinafter given, a solvent mixture comprising diethylene glycol butylether and dibutyl phthalate is illustrative of the type of solvent media which are preferred. Diethylene glycol butylether has a vapor pressure at room temperature (20°- 25° C.) of about .08 millimeter of mercury. When the diethylene glycol butylether is mixed in a proper proportion with another solvent which has no appreciable vapor pressure at room temperature, such as dibutyl phthalate in the example given, the vapor pressure of the solvent mixture at room temperature is accordingly repressed still further. It is to be understood, therefore, that solvents having a vapor pressure of about .05 millimeter of mercury or less when mixed with other solvents having sufficiently low vapor pressure at room temperature, will come within the scope of the present invention. It is also the case that some solvents unmixed may have a very low vapor pressure at room temperatures but a very high vapor pressure above 100° C. and may, therefore, come within the scope of the present invention.

Page 3 line 17, cancel "further" and insert -- seem to be best obtained by the use of a main solvent, such as diethylene glycol butyl ether,; line 20, cancel "as" and insert and characterized in.

Page 3 line 25, after "alone" insert the following:

Certain high boiling point solvents of the nature alluded to are unique in that they not only serve to plasticize the gummy film obtained after the main solvent has evaporated, but they also exert a solvent action upon the cellulose compound or natural or synthetic resin sought to be dissolved. Such solvents do not evaporate upon heating the compound, for they boil at considerably higher temperatures than are necessary to drive off the main solvent. Yet, as above indicated, such solvents have a negligible vapor pressure at ordinary temperatures and at the same time exert a repressing action on the other solvents and may be admixed with such other solvents in order to reduce or repress the normal vapor

Defendant's Exhibit E.

pressure of such other solvents at room temperature. Thus, the dibutyl-phthalate referred to in the following example as illustrative will be seen to be of considerable importance by reason of the fact that its characteristically low vapor pressure at ordinary temperatures (this solvent has no appreciable vapor pressure at room temperatures) makes it admirably suited for intermixture in a proper proportion with solvents whose vapor pressure at room temperature is too high to enable them to be used alone as a solvent in my novel printing ink, and the vapor pressure of the mixture may thus be regulated so that it falls within the preferred range indicated.

Page 4 line 7, after "product" insert -- and to repress the vapor pressure of the solvent media at room temperatures; line 11, cancel "one" and substitute - .05 of a; line 13, cancel the sentence beginning "It may be" and ending at line 16.

Claims 1, 2 and 3, line 2 of each claim, after "non-volatile" insert (i.e. which has a vapor pressure of .05 of a millimeter of mercury or less).

Claim 1 line 3, and claim 2 line 3, cancel "appreciably greater" and substitute therefor elevated.

Claim 4 line 2, after "pressure" insert of .05 of a millimeter of mercury or less.

Claim 5 line 3, after "pressure" insert of .05 of a millimeter of mercury or less.

Claims 6 and 7, line 3 of each claim, after "pressure" insert of .05 of a millimeter of mercury or less.

Claim 8 line 2, change "cellulose" to a cellulose ester.

REMARKS.

Before discussing the references which have been cited, the Examiner's attention is directed to the general state of the printing art at the present time. With the exception of printing upon very soft and absorbent papers, such as newsprint, it has not heretofore been possible to print and ship the printed material on the same day. Although

Defendant's Exhibit E.

printing presses having comparatively high speeds are now well known and are used extensively in the industry, it is not possible to obtain full advantage of the speed with which they operate on account of the character of the printing inks now obtainable. These inks are relatively slow-drying and it is necessary to associate tympans or slip sheets with the printed material so that the matter may be stacked or wound upon reels and carried to the drying chamber and dried for a period of time before the printed matter can be unstacked or unwound and cut and bound, folded or otherwise prepared for shipment. These known inks have, of course, various different qualities, -- for instance, viscosity, tack, drying properties, etc., -- yet all are characterized by the fact that they are relatively slow drying.

The present invention, by the utilization of a concept which after being explained seems to be extremely simple, overcomes the difficulties inherent in the use of the ordinary printing inks heretofore known. The new ink may be used with any standard equipment without injury thereto. The ink may be left upon the press and in the fountain for any period of time, and during the periods when the press is not normally running, without danger of the ink hardening or congealing, and yet, due to the inherent physical properties of the solvent used, the ink will dry almost instantaneously when subjected to elevated temperatures. This is accomplished by providing any type of drying equipment through which the printed material may run after having been printed upon in the press. The material may be cut, sorted and bound immediately and, depending, of course, upon the efficiency of the equipment used, may be shipped in complete bound form during the same hour in which it was printed. This is an accomplishment which has heretofore been only a dream in the printing industry.

Defendant's Exhibit E.

With the ink of the present invention, no special equipment is necessary and any usual type of heating apparatus used in the drying of continuous sheet goods in general may be utilized.

Other advantages of the invention are as follows:

(1) The ink is non-absorbent and, therefore, less ink is required for a given coverage than is the case with an ordinary ink.

(2) The ink does not "halo", which is a term used in the printing industry to characterize the tendency of an ink to move outwardly from the point at which it has been applied, and thus form irregular markings upon the surface printed upon.

(3) The ink does not harden to an extent which interferes with overprinting. An over-print may be made weeks or even months after the initial printing without any appreciable diminution of the capacity of the material printed upon to take the second print.

(4) Successive sheets of material will not offset or stick together because each ink film dries practically instantaneously. Thus, there can be no smudging due to the wetness of the print.

Other advantages of the invention will be seen from the following discussion of the references which have been cited against the claims.

It is not understood why the Examiner objects to the recitation of the volatility or boiling point characteristics of the solvent employed in the present invention. The volatility and boiling point of the solvent at specified temperatures are factors which may be resolved into terms of vapor pressure, as has been done in some of the claims, and are definite physical attributes of the solvent used. Certainly, the patent law does not forbid an applicant or a patentee from using ordinary descriptive terms of the physical characteristics of an article or a product in claiming his invention. Indeed, such terms are accepted as the common method of description and limitation in accordance with the requirements of the statute. The terms used in applicant's claims

Defendant's Exhibit E.

are no more functional than are the limitations "elongated" or "metallic" when used to define a specific body or member used in a mechanical article, combination or device, and where such a body or member is constructed in accordance with the descriptive limitations imposed and a new and useful result is obtained, a patentable structure has always been considered as having been properly defined. By direct analogy, the particular physical characteristics of the solvent employed in the present invention do not distinguish from the prior art merely in terms of function as contended by the Examiner, but they accurately and positively identify the attributes such solvent must have in order that the new and useful results disclosed may be obtained.

In this connection it is pointed out that it is the physical characteristics of the solvent mixture used in the present invention that are important in securing the results sought. While the organic chemical compound known as diethylene glycol butylether has been given as illustrative of the type of solvent possessing the desired physical attributes, it is pointed out in the specification that any solvent possessing these characteristics may be used. It is these physical characteristics which are utilized and the Examiner is cautioned in his application of the references to look for a composition involving the utilization of these physical principles and not for a composition including the specific chemical illustrated when used for some purpose not concerned with the physical manifestations of such chemical.

As to the objection of indefiniteness, the Examiner's attention is called to the fact that the specification fully sets out the meaning of the terms "low vapor pressure" and "low volatility", and gives definite temperatures at which this vapor pressure or volatility is measured. It has also set out what is meant by "high volatility" and "elevated temperatures". In the specification as originally written and as amended by the accompanying amendatory matter, it is specifically stated that the solvent should have a vapor pressure of one millimeter

Defendant's Exhibit E.

or less at room temperatures, specifically .08 of a millimeter or less, but that upon an elevation of temperature to 100° C. and over, the vapor pressure should rise rapidly to a point where the rate of vaporization is so great that the ink dries almost instantaneously Very few solvents satisfy these requirements, as will be seen upon reference to the table which is submitted herewith. None of the references discloses the use of a solvent which satisfies these requirements, and no reference even remotely suggests the inventive concept of the present application. Although, as previously indicated, the idea seems quite simple and obvious when once its nature is explained, it is in fact a discovery which is of momentous importance in printing and its allied arts, and one which years of experience and practice has until now failed to produce.

The patents cited clearly disclose the fact that although the patentees might have planned to make cellulose ester solutions with slower drying solvents than the ordinary run of lacquer solvents, in order to make brushing lacquers or film marking inks, they did not contemplate making inks for printing paper. The solutions described in these patents, although they are slower drying than ordinary lacquer solutions, are still much too fast in evaporation. The slowest one mentioned, the butyl ether of monoethylene glycol, has a vapor pressure about sixteen times higher than the diethylene glycol butylether of the present application. No continuous printing could be carried out with them because the ink carrying rollers would dry up in a very short time. The patents show that the patentees did not recognize or understand that commercially usable printing inks derived from cellulose esters cannot possibly be made unless solvents are employed which will not evaporate nor dry on the printing roller at ordinary temperature, no matter how thin or fine the ink film may be, as is, for instance, the almost microscopically thin film of ink spread in finest network over the roller in the half tone printing of most illustrations and pictures.

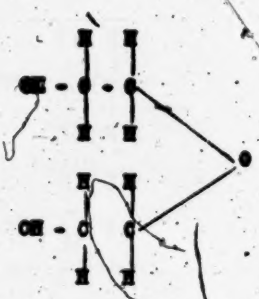
The patentees did not understand that these solvents must possess an exceedingly low vapor pressure at ordinary temperature. The example in the present specification uses diethylene glycol butylether which has a vapor pressure of .05 mm. at 20° C. which is about 350 times less than that of water at 20°C. and consequently possesses so little tendency to evaporate that a thin film will stay wet for an indefinite time. However, at sufficiently raised temperatures these solvents show such a sharp increase in vapor pressure that they will evaporate practically instantaneously if the printed material is exposed to heat. In the example, diethylene glycol butylether increases its vapor pressure about 360 time at 100° C. over that at 20° C. and about 8000 times at 150° C. The temperature of the printed material when it passes, for instance, over a heated roller, lies between 100° C. and 150° C., and it is evident that practically instantaneous evaporation of the ink takes place and the printed sheet leaves the heating device in a dry state. As previously indicated, the patents cited are barren of any disclosure involving this concept.

It is pointed out that even considering the chemical compounds of the references without reference to their physical characteristics, the Examiner's contention of anticipation fails. Even in a chemical sense there is a wide and unmistakable difference between an ethylene glycol ether and applicant's diethylene glycol ether. This difference is pointed out emphatically in the Durrans book on Solvents which the Examiner himself has referred to. On page 108 line 10 it is stated:

> "The above name (diethylene glycol ethyl ether) commonly given to this ether is incorrect; a more correct name is hydroxy-ethoxy-ethyl ether".

The same observation holds true for the diethylene glycol butyl ether. The mother substance, diethylene glycol, as seen by the following formula, is not a straight alcohol as is ethylene glycol, but is partly converted into an ether, with the formation of an entirely different chemical compound:

Ethylene-glycol



Diethylene-glycol

The patent to Dove relates to the preparation of dye solutions from water soluble dyes without the aid of water. The dye is dispersed in one of a number of derivatives of the ethylene series of hydrocarbons, among which are listed certain monoethylene glycol ethers. These ethers do not possess a low vapor pressure at room temperatures. The n-butyl ether referred to by Dove has the lowest vapor pressure of all those mentioned but is still much too high for use in a printing ink and would result in the rapid evaporation of the solvent of the ink and the drying of the ink on the rolls or in the fountain of the press. It should be noted that the Dove patent is not concerned with cellulose esters or gums at all and, therefore, is quite remote from the present invention.

From the above it will be seen that the solvents of Dove were not chosen by the patentee because of the physical characteristics called for in applicant's claims and that they do not possess such characteristics. There is no mention in the specification of Dove of an ether having a low vapor pressure at ordinary temperatures and high volatility at elevated temperatures. The patent is concerned merely with a limited subject matter concerning dye solutions suitable for impregnating wood and has nothing whatsoever in common with the present applicant's invention.

The Shannon patent is concerned with printing on cellulose ester films such as those used in the moving picture industry. The solvent used by Shannon is ethylene glycol monomethyl ether alone or in combination with the acetate of ethylene glycol monomethyl ether. The

high vapor pressure of this solvent at room temperatures (see table submitted herewith) precludes all possibility of using the product as a solvent for printing inks applicable to the general field. It is apparent that the solvent of Shannon could not be used in applicant's composition and that the disclosure of these solvents in no sense anticipates the use of solvents having entirely different characteristics and chosen for a specific and different purpose as in the present applicant's invention.

The Shipley patent is concerned with a brushing lacquer such as that alluded to in applicant's specification in the paragraph beginning on page 1 line 87, and is one which is highly volatile at room temperatures. The specific solvent used is butyl ether of monoethylene glycol (the same as one of those mentioned by Rowe), and the vapor pressure of this solvent at room temperatures is much too high to be usable for printing inks.

In addition it is pointed out that the Shipley patent makes repeated allusions to the necessity of adding driers (see page 1 lines 43-47 inclusive, and page 2 lines 13-24 inclusive), and it is thus apparent that Shipley is concerned with a brushing lacquer which is so volatile at ordinary temperatures that it dries at such temperatures in very short periods of time. As stated in applicant's specification, such a lacquer is entirely unsuitable for the purposes of the present invention.

The Middleton patent, like Shannon, is for cellulose ester moving picture films. The solvent employed is either monoethylene ether of ethylene glycol or diacetone alcohol. These solvents have high vapor pressure at room temperatures and are desired by Middleton because "they have highly desirable drying properties" (See page 1 lines 96, 97 of Middleton patent). These solvents (see table) belong to the class of high vapor pressure solvents and have no bearing on the present invention except in so far as they emphasize the applicant's departure from the known art.

The British patent No. 260,615 is concerned with printing linoleum. The patentee merely mixes drying oils and certain high boiling

point solvents with a cellulose ester to give quicker drying. It is apparent that even at the high temperature in the drying apparatus used in the linoleum industry, the drying time required is two or three days. (See page 3 line 7 of the British patent). Ethyl lactate, butyl lactate, glycerol diethyl ether are the solvents used. All have high vapor pressures at room temperatures and are distinctly different from those which are desired in the printing ink of the present invention. Solvent naphtha (boiling point varying between 120-180° C.) possesses a high rate of evaporation and even though the high boiling point solvents, butyl lactate or the butyl ether of ethylene glycol (see remarks directed toward Dove and Shipley), are much too fast in evaporation by themselves for use in printing inks, their admixture with naphtha shows clearly that the inventors of the process of the British patent No. 360,815 had no inkling of what solvents should be used in producing the novel printing ink of the present invention.

As it is apparent that the solvents of the British patent have a relatively high vapor pressure at room temperatures, and are used in a non-analogous art for a different purpose from that which applicant has in mind, it is submitted that the invention of the present applicant is a great deal more than the mere substitution, as contended by the Examiner, of a special solvent in the disclosure of British patent No. 360,815 or in Shipley, as both of these patents are totally lacking in the teaching of the principles of the present invention.

British patent No. 295,750 is for marking fabrics during processing. Like the British patent 360,815, the composition disclosed consists of a pigment, a drying oil, and cellulose ester and "any suitable solvent" (page 1 line 45). There is no suggestion of any particu-

lar physical attributes of a solvent which can be used to satisfy the requirements of the present invention. Ethyl acetate, the particular solvent which is given, has a very high vapor pressure at room temperatures and is, therefore, completely outside the range of the present invention.

The disclosure in the publication "Solvents" has to do with the solvent properties inherent in diethylene glycol butylether but contains no disclosure of the vapor pressure characteristics. Even if this publication did contain a disclosure of this nature, it would not be a reference for the present invention as the application of these properties to the specific purpose disclosed in the present specification is something which it is not possible to gather from the matter set out on page 108 of the publication mentioned. In this connection it is pointed out that this reference is contradictory even in its disclosure of the solvent properties of the composition as it states that it dissolves cellulose acetate (11th line from the bottom), yet later states that it does not dissolve cellulose acetate (9th line from the bottom). It is not seen what possible connection the reference has with the present invention except to confirm the existence of a compound which is given as illustrative of the type which may be used by the applicant. The existence of such a compound is, of course, admitted.

A list of vapor pressures, evaporation rates and boiling points of the various solvents of the references, as well as the same characteristics of the exemplary solvents of the present invention, are set out below in order to facilitate comparison.

Defendant's Exhibit E.

Name of Solvent	Evaporation rate	Vapor Pressure in mm. at 20° C.	Boiling Point
Ethyl-acetate	-	72.8	77°
Water	-	17.4	100°
Ethylene-glycol-methylether	-	7.8	124°
Ethylene-glycol-ethylether	84	4.6	134°
Ethylene-glycol-ethylether-acetate	50	1.85	150°
Ethyl-lactate	58	-	137°
Diacetone	34	-	160°
Ethylene-glycol-butylether	25	.85	170°
Butyl-lactate	13	-	185°
Di-ethylene-glycol-butylether	-	.05	222°
Di-butyl-phthalate	-	-	340°

The above table has been made up from available sources of information. When figures on vapor pressure at 20° C. were not available the figures of evaporation rate have been supplied.

Also submitted as Schedules A and B are photostatic copies of pages 7 and 11 respectively of the article "The Glycol Ethers and Their Use in the Lacquer Industry" by J. G. Davidson. The photostats are taken from a reprint of the article bearing the legend "Reprinted from Industrial and Engineering Chemistry, Vol. 18, No. 7, page 669, July, 1926". The charts show the vapor pressure of the important organic solvents as well as those of the plasticizers. On Schedule A applicant has indicated the approximate curves for diethylene glycol butyl ether and for butyl phthalate, indicated by the letters B and C respectively. While the charts do not show the differences between the compounds in the lower portions of their vapor pressure curves, they do show the distinct differences between the various compounds at higher temperatures. However, the charts are submitted more for the information of the Associate Examiner (who kindly granted an interview to the attorney of record recently) than as support for the remarks of the present amendment, as the table above referred to is thought to be ample support for the latter.

The claims have been amended definitely and clearly to set

forth the differentiating features discussed above, and to define the invention over the references cited. They will, therefore, not be individually commented upon except to state that the broad claims have been amended to specify the upper limit of .02 of a millimeter as the vapor pressure of the solvent at room temperatures, and that the references fail to suggest a solvent of this nature or a composition at all similar to that recited. It is pointed out, however, that claim 6 calls for any coloring material incorporated in a solution of nitrocellulose, while claim 7 is more limited in specifying a pigment dispersed in such a solution. It is felt that these two claims quite clearly are patentably distinct from one another.

Favorable reconsideration is thought to be in order.

Respectfully submitted,

Charles Holland

Attorney for Applicant.

Defendant's Exhibit E.

Schedule A

Cyclic Ether Derivatives of the Glycols

The elimination of a molecule of water from a single molecule of glycol instead of from two, as in the formation of the polyglycols, results in the formation of a cyclic ether, usually called an oxide.

In this way ethylene, propylene, and butylene oxides may be produced from their respective glycols. These oxides

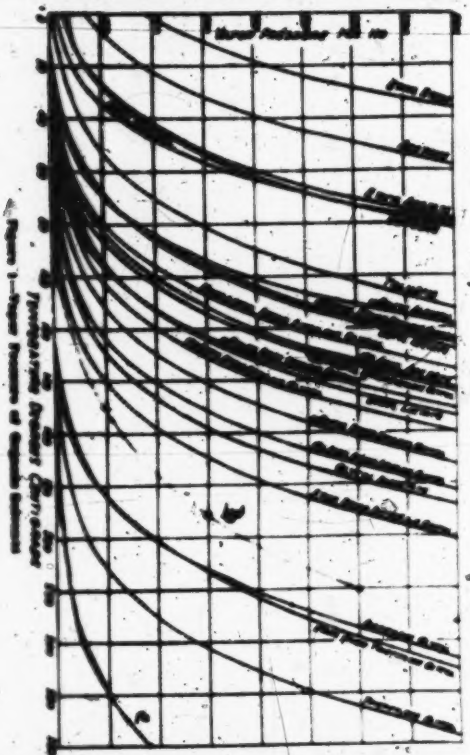


Figure 1—Vapor Pressure of Organic Solvents

are very powerful solvents, dissolving cellulose nitrate, acetate, and ether with avidity. They are soluble in water and are almost odorless. Ethylene and propylene oxides, having the respective boiling points of 10.5° and 35.0° C., are too volatile for general use, but the higher boiling oxides should prove important industrial solvents.

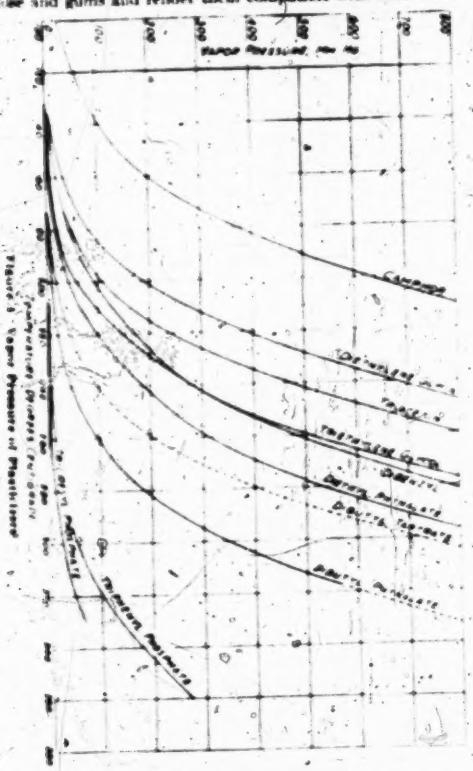
Only one ethylene oxide is possible, but two propylene and

Defendant's Exhibit E.

Sched le B

cated, not upon the fundamental requirements of an ideal film, but principally upon the availability at reasonable cost of nitrocellulose solvents in the "medium boiler" class. The choice of solvents in this range has never been very large and until now has, for all practical purposes, been limited to a single ester.

An ideal solvent is one that will readily dissolve nitrocellulose and gums and render them compatible with each other.



It must not evaporate so rapidly that "orange peel" or other surface defects will appear. It must permit high dilution with the cheaper nonsolvents such as toluene, and the addition of small amounts of water without precipitation of the nitrocellulose. It is also essential that the solvent will not hydrolyse with the production of acid, as this would have a deleterious effect upon the permanency of the film. Hydrolysis

Defendant's Exhibit E.

Div: 64 Room 4708 50/[redacted] Paper No. 4

DEPARTMENT OF COMMERCE
UNITED STATES PATENT OFFICE

Please find below a communication from the EXAMINER in charge of this application.

[redacted] Commissioner of Patents.

Albert E. Gessler

Charles J. Holland,
420 Lexington Avenue,
New York, New York.

Ser. No. 622,453
Filed July 14, 1932
For Printing Ink and Method of Utilizing Same

MAILED SEP 13 1933

Responsive to amendment filed June 15, 1933:

Additional references cited:

Von Hüeckeroth - "Lacquer Liquids" Circular No. 359 - Pages 108 and 149 - Jan., 1930 - H. A. Gardner, Washington, D. C. Copy in 134-79 in Division 50)

Lawrence	1,899,420	Feb. 28, 1933 (filed June 26, 1928)	134-28
Johnson (Br.)	335,074	Sept. 18, 1930 (no drawing-2 sheets spec.)	134-35

This application is now in Division 54.

Claim 3, line 2, the suggested amendment to "non-volatile" cannot be made as the term is not found in the claim.

Claim 1, line 2, the parentheses should be erased as they are not proper, and note Ex parte Cahill, page 78 of 1893 C. D.

Claims 1 to 7, "room temperatures" is indefinite as the temperature of a room varies as from 20° to 90° F, depending upon the season and whether the room is heated or not. Possibly applicant means 20° C.

Claims 1 to 7, "elevated temperatures" is indefinite and comparative. Note Ex parte Mayle, 3 0. G. 751, Ex parte Smith, 399 O. G. 209, and the recent decision, In re Short, 432 O. G. 513. Claims 1 to 7, inclusive, are accordingly rejected as indefinite and as not pointing out the alleged invention for including the indefinite and

Defendant's Exhibit E.

SHEET NO. 2 Serial No. 622,453

comparative terms stated above.

Claims 1 to 6, inclusive, are rejected as drawn broader than the alleged invention which, as stated in the oath and object of invention, is a printing ink. Claims 1 to 6, inclusive, are also rejected as readable upon page 149 of Circular 359 in which butyl carbitol is disclosed as having a vapor tension of .05 m.m. of mercury and is said to be a solvent for nitrocellulose and very useful where a slowly evaporating solvent is desired. Imperial 300,815 of record shows the use of dissolved nitrocellulose as a coating composition, also does Shipley of record.

Claim 7 is rejected similarly as unpatentable over page 149 of Circular 359 as it is old to use dissolved nitrocellulose in an ink as shown by Celanese, 296,759 of record or 335,074.

Claims 8 and 9 are rejected likewise as substantially met by the butyl carbitol described in Circular 359. Cellanese shows using chrome yellow as a pigment.

Claim 10, line 3, "plasticizing ingredients" is too broad as only one plasticizer is disclosed.

Claim 10 is rejected as unpatentable over Circular 359 which on page 108 shows dibutyl phthalate to be old as a plasticizer for nitrocellulose, and on page 149 shows butyl carbitol as a solvent for nitrocellulose. To mix these two ingredients broadly to form an ink is not thought to be patentable.

Lawrence is made of record as pertinent and shows using carbitol and ethyl cellulose with air-blown castor oil.

S C

EXAMINER.

Defendant's Exhibit E.

334

5/13

U. S. PATENT OFFICE
RECEIVED
JUL 14 1934
DIVISION 64

Div. 64 Room 4408
ALBERT E. GESSLER
PRINTING INK AND METHOD
OF UTILIZING SAME
Serial No. 688,488
Filed July 14, 1933.

New York, March 13, 1934.

HON. COMMISSIONER OF PATENTS,
Washington, D. C.

S i r : -

Replying to Official Letter dated September 15, 1933, applicant amends as follows:

Specification, page 1 line 30, after "volatility" delete the period and insert and the dissolved substances are present therein in relatively low concentration.; same line, cancel "this characteristic is" and insert these characteristics are; same line, cancel "an" and insert of.

Page 2 line 1, cancel "a" and insert free-flowing and; same line, cancel "is" after "hardening" and insert are; line 2, before "rapid" insert low concentration of solids and; same line, change "renders" to render; line 9, before "cellulose" insert low viscosity; same line, after "in" insert neutral; line 27, insert neutral before "solvents"; line 28, after "which increase very rapidly upon elevation of temperature" insert:

Inks prepared with such solvents are sufficiently free from highly volatile, low-boiling solvents as to be substantially non-drying at room temperatures.

Same page, line 29, after "solutions" cancel "in contradistinction to lacquer solutions which require solvents that are highly volatile at ordinary temperatures", delete the comma after "temperatures" and insert differ from lacquer solutions which are of relatively low solids concentration and require solvents that are highly volatile at ordinary temperatures. In sharp contrast, those of the present invention are of a relatively high concentration, sufficient to produce the normal qualities of tack and viscosity of a printing ink, and.

6

Defendant's Exhibit E.

B 2251

Page 2 before line 86, insert the following paragraph: By room temperatures, I mean the ordinary temperatures of a room in which technical work is carried on, which is generally accepted to be 20° to 25° C.

Page 3 line 8, after "raised" insert:

In other words, such solvents boil on elevation of the temperature to say 200° or higher, and the vapor pressure increases to 760 millimeters of mercury.

Cancel the claims and substitute the following:

11. A printing ink sufficiently free from highly volatile solvents as to be substantially non-drying at room temperatures, comprising a coloring material incorporated in a vehicle consisting of low viscosity materials selected from the group comprising cellulose compounds and resins dissolved in neutral organic solvents in sufficient concentration to produce the normal qualities of tack and viscosity of a printing ink ~~as contrasted with the characteristically low concentration of a lacquer~~, such solvents having a vapor pressure of 760 millimeters of mercury at 200° C. or higher and not more than approximately .05 millimeters of mercury at 20° C., and having the property of evaporating rapidly at elevated temperatures, said ink being thereby adapted to form a print that dries rapidly on heating.

12. A printing ink sufficiently free from highly volatile solvents as to be substantially non-drying at room temperatures, comprising a coloring material incorporated in a vehicle consisting of low viscosity cellulose esters, dissolved in neutral organic solvents in sufficient concentration to produce the normal qualities of tack and viscosity of a printing ink ~~as contrasted with the characteristically low concentration of a lacquer~~, such solvents having a vapor pressure of 760 millimeters of mercury at 200° C. or higher and not more than approximately .05 millimeters of mercury at 20° C., and having the property of evaporating rapidly at elevated temperatures, said ink being thereby adapted to form a print that dries rapidly on heating.

Defendant's Exhibit E.

13. A printing ink sufficiently free from highly volatile solvents as to be substantially non-drying at room temperatures, comprising a coloring material incorporated in a vehicle consisting of a resin that is solid, coherent and non-sticky when solvent free dissolved in ~~neutral~~ organic solvents in sufficient concentration to produce the normal qualities of tack and viscosity of a printing ink ~~as contrasted with the characteristically low concentration of a lacquer~~, such solvents having a vapor pressure of 760 millimeters of mercury at 200° C. or higher and not more than approximately .05 millimeters of mercury at 20° C., and having the property of evaporating rapidly at elevated temperatures, said ink being thereby adapted to form a print that dries rapidly on heating.

14. A printing ink sufficiently free from highly volatile solvents as to be substantially non-drying at room temperatures, comprising a coloring material and a plasticizer incorporated in a vehicle consisting of low viscosity materials selected from the group comprising cellulose compounds and resins that are solid, coherent and non-sticky when solvent free dissolved in ~~neutral~~ organic solvents in sufficient concentration to produce the normal qualities of tack and viscosity of a printing ink ~~as contrasted with the characteristically low concentration of a lacquer~~, such solvents having a vapor pressure of 760 millimeters of mercury at 200° C. or higher and not more than approximately .05 millimeters of mercury at 20° C., and having the property of evaporating rapidly at elevated temperatures, said ink being thereby adapted to form a print that dries rapidly on heating.

15. A printing ink sufficiently free from highly volatile solvents as to be substantially non-drying at room temperatures, comprising a pigment incorporated in a vehicle consisting of low viscosity nitrocellulose dissolved in diethylene glycol butyl ether and admixed with dibutyl phthalate, the concentration of said dissolved materials being sufficient to produce the normal qualities of tack and viscosity of a printing ink ~~as contrasted with the characteristically low concen-~~

Defendant's Exhibit E.

~~vention of a lacquer~~, the solvents having a vapor pressure of 760 millimeters of mercury at 200° C. or higher and not more than approximately .05 millimeters of mercury at 20° C., and having the property of evaporating rapidly at elevated temperatures, said ink being thereby adapted to form a print that dries rapidly on heating.

REMARKS.

The claims have been rewritten as a result of a recent interview very courteously accorded the applicant and his attorney by the Examiner. In drawing these claims, the applicant has endeavored to adhere to the requirement of clear definition and in addition he has endeavored to emphasize the distinctions over the prior art which the Examiner indicated to be requisite. The applicant's contribution to the art was recognized by the Examiner and the main points of contention were concerned with the formal construction of the claims.

In respect to the Examiner's objection that "room temperatures" is indefinite, it is respectfully pointed out that this term is used quite universally to mean ordinary or normal temperatures of a room in which people live and work, especially where scientific work is carried out. In the United States the term means about 25° C.; 24° C. or even 23° C. would be room temperatures, being as near 25° C. as may be. An experimenter when told to carry out an experiment at room temperature would take it for granted that some temperature approximately 25° C., as nearly as conditions at the time permit, are quite in line with these instructions. In England and on the Continent, 20° C. is generally considered the standard of room temperature, and any temperature approximating 20° C. is to be considered satisfactory if room temperature is required.

The term "room temperature", therefore, means a substantially distinct range of temperature around 25° C. or from approximately 20° C. to approximately 25° C. A skilled chemist does not feel at all uncer-

Defendant's Exhibit E.

tain when room temperatures are specified and to him there is nothing indefinite about it.

The quality of applicant's solution or solvent, of being highly volatile when subjected to heat, is an important counterpart of its characteristic of manifesting little if any volatility at room temperatures. This quality may be described variously in the specification and claims as the quality of being "highly volatile at elevated temperatures", as having the property of evaporating rapidly at elevated temperatures, or as characterized by "a rapid rise of its vapor pressure curve at elevated temperatures". In this connection it is requested that the Examiner consider again that the teaching of the present invention includes a new correlation and adaptation of these qualities. If a solvent or solution is used to make an ink, which solvent or solution has no vapor pressure at room temperature but is highly volatile at 90° C., the teaching of the invention is satisfied. Similarly, if high volatility (that is, the point of rapid volatilization) is not obtained until 800°C. is attained, the teaching of the invention is still followed. Any solvent or solution which possesses the quality of substantially no vapor pressure at room temperatures but whose vapor pressure curve rapidly rises upon elevation of temperature, comes within the teaching of the present applicant. It would be distinctly unfair to limit him to a specific temperature range as a measure of high volatility. In the light of applicant's teaching, "elevated temperatures" is not indefinite at all; in fact, it quite clearly and exactly defines this feature of the invention. In other words, while applicant is prepared to admit that, abstractly, "elevated temperatures" does not specify a definite range, the term as used in this specification is quite sufficient and definite in pointing out the qualities of the solvents or solutions required to satisfy his teaching.

In order, however, to give an indication of the high boiling characteristic of the solvents used in the present invention, the spec-

Defendant's Exhibit E.

ification and claims have been amplified by calling for a boiling characteristic, -- i.e., where the vapor pressure becomes equal or greater than atmospheric pressure -- of 760 millimeters of mercury at 200° C. or higher. Pure diethylene glycol butyl ether boils at 231.2° C. at 760 mm. atmospheric pressure.

The decisions cited by the Examiner do not support him. None of them contain the remotest implication that "elevated temperatures" is an indefinite expression, or that a claim including it is improper for this reason. That the particular expressions considered in these cases cited were disapproved is no reason whatever for holding the expression under consideration -- one different in nature and used in a descriptive and not a qualifying sense -- to be improper. The expressions are distinctly and unmistakably different. The abstract indefiniteness of "elevated temperatures" is not applicable to the present case because the expression is not used in a qualifying sense and is not open to any doubt in the light of the present applicant's teaching.

In view of the above it is felt that the Examiner will perceive that the formal objections to the terms "room temperatures" and "elevated temperatures" on the ground of indefiniteness is not well taken and will find that the new claims are in full accord with the spirit as well as the letter of the statute, despite the fact that they still include such expressions.

It is not felt that the claims either as originally written or in their amended form are either broader than the invention or readable on page 169 of the circular cited. Broadly, a printing ink is a coating material, and such a material having a vehicle comprising a solution of nitrocellulose in a solvent such as butyl carbitol, which solution predominates in the characteristics of butyl carbitol, is new with applicant. This is true despite the disclosure in von Hueckeroth's circular, for this reference merely gives the formula for butyl carbitol together with some of its characteristics. These factors are conceded to be well known. While there is an observation that it is a solvent

Defendant's Exhibit E.

few nitrocellulose, this is no anticipation of applicants product, as applicant is not claiming that he has discovered a new solvent for nitrocellulose. While, also, it is observed that it, butyl carbitol, is useful where a slowly evaporating solvent is desired, there is no suggestion that it is to be desired in a product such as applicant's. This is only apparent in retrospection, in view of applicant's disclosure of a specific product where it is desired and where he himself has discovered its desirability. In other words, the proposed use of butyl carbitol as suggested by von Hueckeroth does not imply that it is possible to make a coating composition with it, particularly one where the characteristics of butyl carbitol predominate.

The claims have, however, been amended to call for a printing ink. This has been done merely to expedite the prosecution of the case and to emphasize the novelty of applicant's product. It is unmistakable that the von Hueckeroth circular is totally lacking in anticipation of applicant's printing ink, as printing inks have not been made with nitrocellulose, nor have they heretofore been made with the solvents or solution specified by applicant.

British Imperial No. 360,815 and Shipley are not concerned with printing inks having solvents of the characteristics recited, and do not aid the von Hueckeroth disclosure as an anticipation of either a coating composition or a printing ink. Von Hueckeroth, while containing a disclosure of butyl carbitol, does not suggest the use of this solvent for either a coating composition or a printing ink; while the other two references, containing as they do a disclosure of solvents with high vapor pressures and high volatility at room temperature, do not suggest the use of a solvent having the characteristics of butyl carbitol for either of them. There is no proper ground for applying these references by substitution as no one of them suggests the teaching of applicant's invention.

In Kulp vs. Bridgeport Hardware Co., 19 Fed. (2) 630, Judge Thomas said:

Defendant's Exhibit E.

> * * * * * in order to negative invention in a novel combination, it is necessary to find in the prior art, not merely a construction which might be modified to make the device at bar, but somewhere a suggestion, not only that the modification should be made, but how to make it".

This view of the patent law is well recognized and the Examiner will readily perceive that it vigorously disapproves a combination of unrelated patents, as are those cited in the present case, to construct a retrospective anticipation.

There is no principal reference which suggests that the Examiner's proposed modification should be made, or how it can be made. Independent features of each reference must be chosen and their relation to each other is not suggested except by applicant's own disclosure. It is felt that the combination of references is both improper and unfair, and in derogation of Sec. 4886 R. S.

Specifically, Celanese No. 96,759 is concerned with a fabric-marking ink having a solvent possessing a very high vapor pressure at room temperatures; British No. 335,074 is for a lithographic printing process in which water-repellant solvents are employed which have low vapor pressures at room temperatures, but whose vapor pressure curves do not rise markedly when subjected to elevated temperatures; these references contain no suggestion that solvents like butyl carbitol, having practically no vapor pressure at room temperatures but which vaporize rapidly at elevated temperatures, may be used to dissolve cellulose compounds or resins and formed, with a color, into a composition having qualities of tack and viscosity of a printing ink, nor do they contain any suggestion of the new and useful, indeed the startling results to be obtained by their use in the printing art. And von Hueckeroth doesn't even suggest that the compound he has listed can be used effectively as a coating composition, much less a novel printing ink, where the results of its use would be far more than what von Hueckeroth or any person skilled in the art would have expected. These results are fully stated in the specification and were thoroughly discussed in the last amendment.

Defendant's Exhibit E.

The addition of the subsidiary features of the references, such as the use of chrome yellow in Colmecs and the listing of dibutyl phthalate as a plasticizer on page 109 of von Hueckeroth, does not aid in remedying the primary lack of anticipation apparent in these references. The fact that the Examiner is compelled to single out these additional features merely emphasizes the lack of a coherent understanding of applicant's invention by prior art workers.

British patent No. 388,074 is for a lithographic printing process in which the predominant portion of the solvents and oils employed are chosen for their water-repellant characteristics, and which differ widely from the solvents used in the Gessler invention. Most of the solvents of the British patent possess no marked rise in their vapor pressure curves on elevated temperatures. The drying, therefore, of the inks in which they are used cannot be accomplished by exposing the prints to elevated temperatures. This, however, is what is accomplished in the Gessler invention and the heating step brings about an almost instantaneous evaporation and effectively dries the ink. This important feature of the present invention contrasts sharply with the process of the British patent which requires drying by the slow, time-taking adsorption of the solvents into the fibers of the paper. The advance over the teaching of the British patent is unmistakable.

Lawrence is cited as showing the use of carbitol in conjunction with ethyl cellulose and castor oil. Carbitol (diethylene glycol ethyl ether) however, is a compound chemically quite distinct from butyl carbitol which is diethylene glycol butyl ether, and among other distinctions possesses a vapor pressure of .13 mm. at 20° C. which is several times as great as that set forth as the upper limit in applicant's claims.

Issue is vigorously taken with the Examiner's assertion that to prepare an ink by mixing the compound listed on page 108 and that listed on page 149 of von Hueckeroth, does not amount to invention. To be sure, the composition of such an ink, as a fait accompli, is simple,

but simplicity does not negative invention. Moreover, von Hueckeroth does not suggest that this composition should be made, or how to make it; and the new and useful results accruing are such that it is incontrovertible that von Hueckeroth did not contemplate them.

The amendments to the specification inserted by the present amendment are merely explanatory of subject matter the gist of which has already been disclosed. If the Examiner desires a supplemental oath under Rule 48, the same will be submitted.

It is respectfully suggested that the Examiner is not viewing this applicant's invention in the light of the prior art, but on the contrary is viewing the prior art in the light of the present invention. It is submitted that this viewpoint is improper, and that an anticipation constructed from it is not only synthetic and imaginary, but has been disapproved by the Patent Office tribunals and the Courts.

In view of the above, favorable reconsideration is thought to be in order.

Respectfully submitted,

Charles Holland

Attorney for Applicant.

38

Defendant's Exhibit E.

Room 4708

DEPARTMENT OF COMMERCE
UNITED STATES PATENT OFFICE
WASHINGTON

Paper No. 6

80/he

Please find below a communication from the EXAMINER in charge of this application.

Commissioner of Patents.

Charles J. Holland,
420 Lexington Ave.,
New York, N. Y.

Applicant: Albert E. Cessler
Ser. No. 622,453
Filed July 14, 1932
For Printing Ink and method of utilizing same.

MAILED
JUN 4 1934

In response to amendment filed Mar. 13, 1934.

Additional references cited:

Lawrence (filed Feb. 20, 1930)	1,954,450	Apr. 10, 1934	41-33
Reese (filed June 2, 1932)	1,924,961	Aug. 29, 1933	41-33
Lawrence	1,858,673	May 17, 1932	41-33
Reese (filed Nov. 2, 1931)	1,893,765	Jan. 10, 1933	41-33

Page 3, line 8, amendment B[4], "200" should have either "F" or "F." inserted thereafter.

Claims 11, 12 and 14 are rejected as too broad as all cellulose compounds and cellulose esters do not dissolve in butyl carbitol, and in the Davidson article on glycol ethers in the July, 1926, number of Industrial and Engineering Chemistry referred to by applicant, it is stated on page 671 that cellulose acetate is insoluble in butylether of diethylene glycol. Accordingly these claims are so broad as to include inoperative cellulose compounds and esters.

Accordingly the only operative cellulose ester disclosed is nitrocellulose and the claims should be restricted thereto.

Claims 11, 13 and 14 are rejected as readable upon Lawrence, 1,954,450, a recent patent, who discloses making a printing ink containing synthetic resin, diethylene glycol butyl ether, and a pigment.

Claims 12 and 15 are rejected as substantially met by 1,954,450 in view of applicant stating on page 4, lines 3 to 5 that nitrocellulose may be replaced by synthetic

Defendant's Exhibit E.

resins, which are obviously equivalents.

Reese 1,924,961 also shows using resinous material with butyl carbitol, and also uses nitrocellulose, and note page 4, lines 101 to 112. So apparently synthetic resin and nitrocellulose are equivalents in the art. In 1,858,673, Lawrence discloses the use of both a cellulose compound and a synthetic resin with butyl carbitol.

The addition of a plasticizer such as dibutyl phthalate is old as stated in the last Office action, Lawrence 1,899,420, of record shows the use of tricresyl phosphate which is a low volatile solvent similar to dibutyl phthalate and to add these well known plasticizers is not thought to be patentable especially as no definite percentage is added and a very small amount would thus be included by the terms of claim 15. Reese, 1,893,785, shows the use of tricresyl phosphate, diamylphthalate, and diethyl phthalate as plasticizers together with dissolved cellulose esters, so apparently the selection of any of these well known plasticizers is a matter of choice.

J. M. Dennison

Examiner.

MAIL DIVISION
-4 34
U.S. PATENT OFFICE

Defendant's Exhibit E.

Div. 64 Room 4708
ALBERT E. CHESLER
PRINTING INK AND METHOD
OF UTILIZING SAME
Serial No. 682,453
Filed July 14, 1933.

New York, June 8, 1934.

HON. COMMISSIONER OF PATENTS,
Washington, D. C.

S i r : -

Supplementary to the amendment dated March 12, 1934, please add the following claims:

16. A printing ink sufficiently free from highly volatile solvents as to be substantially non-drying at room temperatures, comprising a coloring material incorporated in a vehicle consisting of low viscosity materials selected from the group comprising cellulose compounds that are solid, coherent and non-sticky when solvent free and resins, dissolved in solvents in sufficient concentration to produce the normal qualities of tack and viscosity of a printing ink ~~as contrasted with the characteristically low concentration of a lacquer~~, such solvents having a vapor pressure of 760 millimeters of mercury at 200° C. or higher and not more than approximately .05 millimeters of mercury at 20° C., and having the property of evaporating rapidly at elevated temperatures, said ink being thereby adapted to form a print that dries rapidly on heating.

17. A printing ink sufficiently free from highly volatile solvents as to be substantially non-drying at room temperatures, comprising a coloring material incorporated in a vehicle consisting of low viscosity cellulose esters that are solid, coherent and non-sticky when solvent free, dissolved in solvents in sufficient concentration to produce the normal qualities of tack and viscosity of a printing ink ~~as contrasted with the characteristically low concentration~~ of a lacquer, such solvents having a vapor pressure of 760 millimeters of mercury at 200° C. or higher and not more than approximately .05 millimeters of mercury at 20° C., and having the property of evaporating rapidly at elevated temperatures, said ink being thereby adapted to form a print that dries rapidly on heating.

Defendant's Exhibit E.

REMARKS.

The above claims have been added in order to remove the expressions indicating that the applicant's invention is limited to the use of neutral organic solvents. Upon referring to the specification, the Examiner will find ample disclosure to support the applicant's broad teaching of a new and useful printing ink in which a coloring material is incorporated in the vehicle containing solvents having peculiar characteristics stated. As applicant is the first to produce this new and useful printing ink and the first to teach the principles underlying its preparation and use, it is felt that there is no basis for his limiting himself to the use of the particular class of solvents which he has chosen to mention in his specification for purposes of illustration.

In the interview with the Examiner in the early part of March, the latter indicated the necessity of applicant including in his claims a recital of these neutral organic solvents; yet, so far as applicant is aware and so far as the record shows, there is no reference which makes it incumbent upon applicant to limit his invention to this extent. By a review of the specification it is believed that the Examiner will readily perceive that applicant is clearly entitled to claims of the scope thus presented by this amendment, and it is believed that these claims w' be found allowable along with those previously discussed with the Examiner and in principle agreed upon as containing allowable subject matter.

A short while ago the Washington associate of the attorney of record called upon the Examiner and called his attention to the fact that every effort had been made to place this case in condition for allowance and that in view of this fact the case was entitled to preference under Commissioner's Order No. 3084. Apparently the Examiner has not seen fit to act upon the case out of turn, but inasmuch as the case comes up for its regular turn on or about the 15th of June, it is

Defendant's Exhibit E.

believed that an early allowance should in all fairness be given.

Respectfully submitted,

Charles J. Holland

Attorney for Applicant.

Defendant's Exhibit E.

Div. 64 Room 4708 DEPARTMENT OF COMMERCE Paper No. 8

Address only "Commissioner of Patents, Washington, D. C." and not to any officer by name. SC/hb

UNITED STATES PATENT OFFICE WASHINGTON

Please find below a communication from the EXAMINER in charge of this application.

Commissioner of Patents.

Charles J. Holland,
420 Lexington Ave.,
New York, N. Y.

Applicant: Albert E. Gessler
Ser. No. 622,453
Filed July 14, 1932
For Printing Ink and Method of Utilizing Same.

MAILED JUN 5 1934

In response to amendment filed June 4, 1934.

This action is supplementary to the office action of June 4, 1934, as applicant's supplementary amendment of claims 16 and 17 had not been received in the division when the last office action was mailed.

Claim 16 which is similar to claim 11 except that the solvents are more broadly claimed is rejected similarly thereto, as too broad and as unpatentable over Lawrence 1,954,450, of record.

Claim 17 which is similar to claim 12 except that the solvents are more broadly claimed is rejected similarly thereto, as too broad and as substantially met by 1,954,450.

The application has not been acted on out of order as it is not in condition for allowance in view of recent art discovered in another division.

Examiner.

Defendant's Exhibit E.

9
2

LW

IN THE UNITED STATES PATENT OFFICE.

Div. 64, Room 6708;

Application of Albert E. Goodier;

Ser. No. 688,489;

Filed July 14, 1933;

For Printing Ink and Method of Utilizing Same.

U. S. PATENT OFFICE
RECEIVED
AUG 1934
DIVISION 64

New York, August 27, 1934.

Hon. Commissioner of Patents,

Washington, D.C.

Sir:

In response to the Office action of June 5, 1934, please amend the above-entitled application as follows:

Rewrite the amendment previously entered in page 2, line 8, after "raised", as follows:

- In other words, such solvents boil on elevation of the temperature to say 200° C. or higher, and the vapor pressure increases to 760 millimeters of mercury. -

Add the following claims:

- 18. A quick-drying printing ink, comprising a coloring material incorporated in a vehicle consisting of low viscosity materials selected from the group comprising cellulose compounds and resins, that are solid, coherent and non-sticky when dry, dissolved in a solvent in sufficient concentration to produce the normal qualities of tack and viscosity of a printing ink, said solvent having a vapor pressure at elevated temperatures sufficient to cause the same rapidly to vaporize and thereby to dry the ink, but having a vapor pressure at room temperatures of approximately .05 millimeters of mercury.

19. A quick-drying printing ink, comprising a coloring material incorporated in a vehicle consisting of

low viscosity materials selected from the group comprising cellulose compounds and resins dissolved in a solvent in sufficient concentration to produce the normal qualities of tack and viscosity of a printing ink, said solvent having a vapor pressure at elevated temperatures sufficient to cause the same rapidly to vaporize and thereby to dry the ink, but having a vapor pressure at room temperatures of approximately .05 millimeters of mercury, said vehicle comprising also a solvent which has no appreciable vapor pressure at room temperatures.

20. A quick-drying printing ink, comprising a coloring material incorporated in a vehicle consisting of nitrocellulose dissolved in diethylene glycol butyl ether in concentration sufficient to produce ~~a liquid composition having~~ the normal qualities of tack and viscosity characteristic of a printing ink.

21. A vehicle for printing ink, comprising low viscosity materials selected from the group comprising cellulose compounds and resins dissolved in solvents having a vapor pressure at elevated temperatures sufficiently high to cause the same rapidly to vaporize and thereby quickly to dry the vehicle by evaporation, but having a low vapor pressure at room temperatures of approximately .05 millimeters of mercury, said vehicle being sufficiently free from highly volatile solvents as to be substantially non-drying at room temperature.

Defendant's Exhibit E.

22. A vehicle for printing ink, comprising low viscosity materials selected from the group comprising cellulose compounds and resins dissolved in solvents having a vapor pressure at elevated temperatures sufficiently high to cause the same rapidly to vaporize and thereby quickly to dry the vehicle by evaporation, but having a low vapor pressure at room temperatures of approximately .05 millimeters of mercury.

23. A vehicle for printing ink, comprising nitrocellulose dissolved in diethylene glycol butyl ether.

24. A vehicle for printing ink, comprising nitrocellulose dissolved in diethylene glycol butyl ether in concentration sufficient to produce a liquid composition having the normal qualities of tack and viscosity characteristic of a printing ink vehicle.

25. A vehicle for printing ink, comprising nitrocellulose dissolved in diethylene glycol butyl ether in concentration sufficient to produce a liquid composition having the normal qualities of tack and viscosity characteristic of a printing ink vehicle as distinguished from the characteristically low concentration of a lacquer vehicle.

26. A quick-drying printing ink vehicle, comprising low viscosity materials selected from the group comprising cellulose compounds and resins dissolved in a solvent having a vapor pressure at elevated temperatures sufficient to cause the vehicle to dry rapidly by evaporation, but having a very low vapor pressure at room temperatures.

27. A quick-drying printing ink vehicle, comprising low viscosity materials selected from the group comprising cellulose compounds and resins dissolved in a solvent having a vapor pressure at elevated temperatures sufficient to cause the vehicle to dry rapidly by evaporation, but having a vapor pressure at room temperatures of approximately .05 millimeters of mercury.

Defendant's Exhibit E.

28. A quick-drying printing ink vehicle, comprising low viscosity materials selected from the group comprising cellulose compounds and resins dissolved in a solvent in sufficient concentration to produce the normal qualities of tack and viscosity of a printing ink vehicle, said solvent having a vapor pressure at elevated temperatures sufficient to cause the vehicle to dry rapidly by evaporation, but having a very low vapor pressure and evaporation rate at room temperatures.

29. A quick-drying printing ink vehicle, comprising low viscosity materials selected from the group comprising cellulose compounds and resins dissolved in a solvent having a vapor pressure at elevated temperatures sufficient to cause the vehicle to dry rapidly by evaporation, but having a very low vapor pressure at room temperatures; said vehicle containing also a solvent which has no appreciable vapor pressure at room temperatures.

30. A vehicle for printing ink, comprising nitrocellulose dissolved in diethylene glycol butyl ether, and admixed with dibutyl phthalate.

31. A quick-drying printing ink vehicle, comprising low viscosity materials selected from the group comprising cellulose compounds and resins dissolved in a solvent having a vapor pressure at elevated temperatures sufficient to cause the vehicle to dry rapidly by evaporation, but having a very low vapor pressure at room temperatures; said vehicle being sufficiently free from highly volatile solvents as to be substantially non-drying at room temperatures.

32. A quick-drying printing ink, comprising a coloring material incorporated in a vehicle consisting of low viscosity materials selected from the group comprising cellulose compounds and resins dissolved in a solvent which has a vapor pressure at elevated temperatures sufficient to cause the same rapidly to vaporise and thereby dry the ink, but which has a vapor pressure at room temperatures so low as to render the ink substantially non-drying at such temperatures.

Defendant's Exhibit E.

REMARKS.

It is noted that the Examiner has withdrawn from the successive positions taken in the actions of December 27, 1932, and September 15, 1933, and cited a new set of references from Class 41, Sub. 35, Ornamentation, Surface Type, Transfers. It is believed that these references are from a totally non-analogous art and are of less anticipatory value than those upon which the previous rejections were predicated.

The Examiner has objected to claims 11, 13 and 14 as too broad in view of the fact that all cellulose compounds and cellulose esters do not dissolve in butyl carbitol. Applicant is in entire agreement with the Examiner as to his premise but not as to his conclusion. If the Examiner will refresh his recollection of the claims, he will perceive that they call for a printing ink in which certain substances, including cellulose compounds and/or resins, are dissolved in solvents, the characteristics of which are very clearly and definitely stated. True, certain cellulose compounds cannot be dissolved in these solvents, but such compounds are not claimed, for they do not answer the requirement of being compounds dissolved in such solvents. In other words, applicant is only claiming as constituents of his ink cellulose compounds and/or resins which do dissolve and are dissolved in the solvents specified.

Applicant has disclosed on pages 2, 3 and 4 of his specification that it is possible to make a printing ink in which certain cellulose compounds and/or resins may be dissolved in a certain type of solvent and that certain new and useful results obtain. This teaching is in no way limited to the use of the particular cellulose compound given for purposes of illustration. If this were not the case, applicant would be precluded from relying upon the doctrine of equivalents and some futu experimenter in naming a compound which applicant did not specifically allude to, would be encouraged to claim as his invention that which clearly comes under the present applicant's inventive teaching. It is believed that the Examiner does not desire to place an interpretation upon the patent law which would lead to such an unjust and inequitable

result, and will, therefore, not insist that applicant limit himself to the use of nitrocellulose in the composition of his ink.

Claims 11, 13 and 14, to which the Examiner applies the Lawrence patent 1,954,450, are not at all met by it. The claims call for a printing ink comprising substances dissolved in solvents in sufficient concentration to give the normal qualities of tack and viscosity of a printing ink, and not for a marking composition of the fusible type composed of solid waxy materials, and which must be applied to a transfer sheet in heated condition and under heavy pressure. Lawrence is illustrative of this latter type composition, and the whole Lawrence process is predicated on the idea of making a marking composition which will keep relatively plastic on the transfer sheet until such time as the whole composition is transferred to a base, which is likewise accomplished by means of heat and pressure applied simultaneously. Such a process is so differently designed and operated and gives such different results that it contains no teaching whatever analogous to that of the present invention. The Lawrence patent is directed to the problem of making and aging ornamental transfers for marking fabrics, and the stated object of the patentee is to provide a substitute for beeswax as a constituent of the transfer compositions usually desired in that art. Beeswax is desirable in that art because it forms a film over the transfer composition and prevents it from drying. As a substitute for beeswax he proposes a combination of a phenolic condensation product and ozokerite together with a blown oil. These three ingredients must be fused together under heat, as they are not miscible or soluble at ordinary temperatures, and after the melted composition is made it is mixed with other materials which happen to include a solvent which Lawrence thinks is butyl carbitol, a substance which applicant concedes he did not invent. Coloring material is then admixed and the composition is then "panned", which means that it is allowed to solidify in a pan. This composition of Lawrence can only be utilized by heating it to fluidity and then forcing it against the transfer sheet by pressure. After it has been so applied, the composition must be

dried for 24 hours in order to allow the aforesaid film to form.

Such a composition is in no way similar to that of applicant's and could not be used as a printing ink which is applied at ordinary temperatures by pressure but which, in the present invention, is very quickly dried not by oxidation or polymerization, but by evaporation induced by the subsequent application of heat, a procedure which is new in the printing art for the simple reason that it has heretofore not been known how to make printing inks which would respond to this evaporating treatment and yet satisfy the exact requirements of tack and viscosity, etc., for printing inks. The idea of Lawrence is not to provide an ink which will dry immediately by evaporation upon the application of heat, but to provide a marking composition on a transfer sheet which will remain plastic indefinitely and which is protected from complete oxidation or evaporation by a surface film of dried or polymerized material in order to give the same result as the beeswax of the prior art. This is in keeping with the generic idea of ornamental transfers for fabrics and very sharply contrasts with the purpose desired in commercial printing upon paper. It is very plain that not only is Lawrence's purpose unmistakably different, but also is his mode of operation and his result.

Incidentally, it is pointed out that the Lawrence disclosure is so conflicting in respect of the explanation of the action of butyl carbitol that it raises a strong suspicion as to the value of the contribution of the patentee even in his own art. Lawrence's discussion of butyl carbitol is so jumbled and unintelligible that it is obvious that he misunderstood its characteristics. For he says that he wants a solvent which will not evaporate readily and states that butyl carbitol at 100°C. has so high a vapor pressure that it does not evaporate with sufficient rapidity to vary the composition of the marking material. And he goes on to state that some solvents have high boiling points, but because of their low vapor pressure at 100°C. they evaporate too readily. If the Examiner can explain the Lawrence disclosure in this respect,

applicant will appreciate it. It is believed, however, that it is not possible to credit Lawrence with any clear idea of the reasons underlying the use of butyl carbitol in his own transfer composition; much less is it possible to find in Lawrence anticipation of the inventive concepts involved in the production of applicant's printing ink.

The Lawrence patent is also relied upon by the Examiner as anticipating claims 12 and 15 on the basis that applicant has noted an equivalency of synthetic resins or nitrocellulose in his illustrative composition. But the premise that applicant has conceded this equivalency of constituents in his own ink, does not and cannot lead to the conclusion that the substitution of nitrocellulose for the resins of Lawrence would produce applicant's printing ink either as described or as claimed. For applicant requires such cellulose esters or resins to be dissolved in solvents of sufficient concentration to produce the normal qualities of tack and viscosity of a printing ink, such solvents having definite characteristics which will cause the print to dry rapidly on heating. The fact that the illustrative nitrocellulose in this new composition of applicant may be replaced by synthetic resins does not shift this invention into the ornamental transfer art, and the Lawrence patent is just as irrelevant if his fusible marking composition is made up with nitrocellulose as it is when the same is compounded with an artificial resin. The composition of Lawrence is not designed for the purpose, does not function in the manner and does not produce the results which applicant has in mind and which he has achieved.

The Reese patent, 1,924,961, is likewise directed to the art of ornamentation, but in this case the purpose of the patentee is to unite a prehardened decorative film with a base surface in such a manner as to adapt his transfer operation to quantity-production methods. With this in mind the patentee provides a special bonding medium which will unite with a transfer coating of the lacquer type, the latter being

Defendant's Exhibit E.

a coating which dries very quickly because of the highly volatile solvents which are incorporated in it. A specific example of the bonding medium, which serves to hold the design coating to the base, is chosen by the Examiner as anticipatory of applicant's printing ink. This bonding coating, like Lawrence's marking composition, does not have the same purpose, the same function, nor the same result as those desired and obtained by applicant. This bonding medium contains large quantities of solvents having high vapor pressures at room temperature, such as butyl acetate, butanol, ethyl lactate, and toluol, and the fact that it contains also a small quantity of butyl carbitol is of no significance whatever in so far as the present invention is concerned. The Reese bonding medium is not a printing ink and could not be used as such.

In connection with the Reese patent, the Examiner observes that synthetic resin and nitrocellulose are equivalents in the art. Unquestionably, they are equivalents in the ornamental transfer art, but they were not equivalents in the printing ink art until applicant suggested them, for the simple reason that it has heretofore been impossible to use these substances in the printing ink art. They have never been considered a part of the printing ink art. The known use of these substances in connection with a particular composition of one art does not amount to an anticipatory teaching of their use in a totally different composition in the other art, particularly when they have not been, and could not have been, used in that other art.

The Examiner also observes that Lawrence, 1,858,673, discloses the use of both a cellulose compound and a synthetic resin with butyl carbitol. But his composition includes so many other ingredients the nature of which is inconsistent with the purposes of applicant's disclosure that the patent has no significance in so far as concerns the present invention.

In connection with this second Lawrence patent it should be noted that the idea of the patentee is to provide a slow-fusing

composition for the primary element of the transfer and an easily-fusible composition for the background, and it is solely in the composition of the primary element that he uses his monoethyl ether of diethylene glycol solvent. This primary element is similar to applicant's in neither purpose, function nor result, and the solvent alluded to as butyl carbitol is in fact not such.

It should be remembered that the primary coating disclosed in the Lawrence patent, 1,888,765, is designed for the special purpose of uniting it to a background of relatively fusible compounds previously applied to the fabric base. This primary coating could not be used for printing ink, as the type of surface to which printing is customarily applied is not provided with the background composition which Lawrence requires in order to cause his primary element to adhere.

The Examiner's observation that the addition of a plasticizer such as dibutyl phthalate is old and does not amount to invention is queried. To what compound of the art does the Examiner refer in suggesting this addition? It is not seen that there is any sense of contending that applicant's product is anticipated merely because these plasticizers (which are admitted to be old as such) are added to dissimilar prior-art compositions, and so long as there is no composition in the art which anticipates applicant's invention without the use of a plasticizer, it cannot be said that applicant has followed any prior-art teaching by adding such plasticizer to such composition.

As the Examiner has observed, the Reese patent 1,893,786 shows the use of triaresyl phosphate, diamylphthalate, and diethyl phthalate as plasticizers, together with dissolved cellulose esters. But these plasticizers are not dissolved in solvents such as those necessary to the utilization of applicant's invention. The compounds in which these plasticizers are used are for use in constructing a transfer film and not for use in printing ink which must be applied permanently to the paper or other printing surface and which must dry as quickly as possible.

Defendant's Exhibit E.

The compounds in this patent all contain large quantities of solvents such as toluol, methyl cellosolve, diacetone alcohol, ethyl acetate, butyl acetate, butanol, butyl alcohol, cellosolve, and butyl cellosolve, which have a high vapor pressure at room temperature. The presence of these solvents are in direct antagonism to the whole purpose and function of the present invention and, of course, are inimical to the results desired.

After referring to the Reese patent and showing various plasticisers dissolved in cellulose esters, the Examiner finds it easy to conclude that the selection of any of these well-known plasticisers is a matter of choice, but it is thought that this conclusion unfairly detracts from the present invention. For, while the selection of any of these plasticisers may be a matter of choice to users of the Reese process, and are to be considered as equivalents to the substances suggested by Reese for his transfer film, the use of these substances in applicant's ink amounts to invention because the ink is designed for a different purpose, functions in a different way, and produces a different result from those connected with the compounds suggested by Reese. And the different result is beyond question a useful one. It is conceded that the present applicant did not invent plasticisers, but he did invent a new ink, and the fact that certain of the plasticisers he uses are old per se does not at all militate against the novelty of his ink, nor against the basic ideas underlying its composition.

Claims 16 and 17 are rejected as being too broad. If the Examiner means that they are too broad in view of the objections previously noted in connection with claims 11, 12 and 14, this contention has been effectively answered by the statement that applicant is not claiming those compounds which do not dissolve in the solvents specified. If the Examiner means that claims 16 and 17 are too broad in view of any reference other than Lawrence, it is requested that such reference showing them to be broad be cited. The basic nature of applicant's contribution is felt to warrant broad claims, and the cited art more than confirms this belief.

Defendant's Exhibit E.

Claims 18 and 12 are also rejected as substantially met or as unpatentable over Lawrence No. 1,964,450, and for the reasons previously advanced it is believed that this rejection is highly improper and should be withdrawn.

Applicant is somewhat puzzled over the course of the prosecution of this case. Each effort he has made to overcome a combination of reasons and references cited has been met with an acknowledgment of his argument but with a shifting on the part of the Office to another totally different group of references and grounds of rejection, and each new group and ground clearly evidences that an additional search has been necessary to bolster up the rejection originally made. In the last action, applicant made every effort to comply with every requirement and objection noted by the Examiner, and he indicated very clearly his desire to terminate the prosecution of the case. Indeed, he was led to believe that his proposed amendments were adequate to put the case in allowable condition. The Examiner's new rejection upon clearly irrelevant references seems to have been made for the purpose of postponing the issue merely, and a consideration of the remote art and non-analogous art cited tends to confirm this conclusion. It is respectfully requested that bona fide action on the merits be given with a view to according to applicant the protection which the Patent Statutes were designed to afford him.

New claims have been added in order to cover the field which the references show clearly to be unexplored by any previous worker in the art. These claims all include the distinctions noted in the above discussion and are thought very clearly to be allowable. Some of these claims are directed toward the vehicle for the ink, which is part and parcel of the invention of this applicant. The ink cannot be made without the vehicle. The invention of the ink and that of the vehicle are thought clearly to be dependent inventions and are properly to be claimed under the provisions of Rule 41.

Respectfully submitted,

Charles Hovland

Attorney for Applicant

Defendant's Exhibit E.

Div. 64 Room 4708

Address only "The Commissioner of Patents, Washington, D. C." and not any official by name

SC/he

DEPARTMENT OF COMMERCE
UNITED STATES PATENT OFFICE
WASHINGTON

Paper No. 10

All communications respecting this application should give the serial number, date of filing, and name of the applicant

Please find below a communication from the EXAMINER in charge of this application.

Commissioner of Patents.

Applicant: Albert E. Gessler

Charles J. Holland,
420 Lexington Ave.,
New York, N. Y.

Ser. No. 622,453
Filed July 14, 1932
For Printing Ink and
Method of utilizing same

MAILED
NOV 27 1934

In response to amendment filed Aug. 28, 1934.

Additional references cited:

Schneider (filed Jan. 10, 1931)	1,966,907	July 17, 1934	41-26
Fleischmann	1,787,239	Dec. 30, 1930	134-36
Doughty	1,439,696	Dec. 26, 1922	134-36

Claims 11, 12, 13, 14, 15, 16 and 17 are again rejected as unpatentable over Lawrence, 1,954,450 of record for reasons of record as these claims have not been amended. On page 1, line 5, Lawrence states thathe makesa transfer ink which may be considered broadly as a printing ink. In the Davidson article of record on pages 670 and 671, butyl carbitol is disclosed as a solvent for both resin and nitrocellulose. Middleton of record shows using either a resin such as shellac or sandarac, as well as nitrocellulose as base materials in making a printing ink. Fleischmann shows the use also of resins and nitrocellulose in printing inks, so which one is used is thought to be a matter of choice.

These claims are also rejected as substantially met by the recent Schneider patent which discloses such low boiling solvents and plasticizers such as tricresyl phosphate, diamyl phthalate and dibutyl phthalate. Reese, 1,924,961 of record as well as on page 107 of Circular 359 of record it is stated that diamyl phthalate has a very low vapor pressure. Schneider uses resin as a base material.

Claims 12, 15 and 17 which claim cellulose ester as a base material are not thought to be patentable over Schneider as whether cellulose ester or a resin is used is thought to be

Defendant's Exhibit E.

a matter of choice as previously stated.

Claims 18 and 19 are similarly rejected as unpatentable over either 1,954,450 or Schneider who use similar low vapor pressure solvents. As to 1,954,450 not having a clear disclosure of butyl carbitol, it is noted that it is specifically claimed and that it is clearly identified on page 2, lines 29 to 31 by its chemical formula and boiling point.

Claim 20 is rejected as unpatentable over either 1,954,450 or Schneider as to substitute nitrocellulose for resin is not thought to be a patentable distinction.

Claim 32 is rejected similarly to claim 20.

Claim 32 is also rejected as readable upon Doughty who uses a resin and terpineol, a solvent which has a high boiling point and dries very slowly at room temperature.

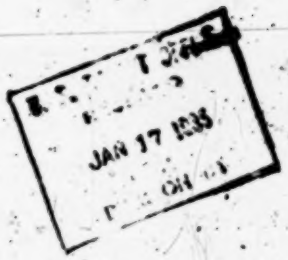
Claims 21, 22, 23, 24, 25, 26, 27, 28, 29, 30 and 31 which are drawn broadly and merely to a constituent of an ink are rejected as unpatentable over either 1,954,450 or Schneider who use resin and low vapor pressure solvents. In claims 23, 24, 25 and 30 which are limited to nitrocellulose as a base material, the nitrocellulose is not thought to be patentable over resin for the reasons stated. These claims which are not limited to a printing ink are rejected also as substantially met by the Reese patents of record who show nitrocellulose and resin having low vapor pressure solvents used which are also used by applicant. Reese shows clearly the use of low vapor pressure solvents as solvents and plasticizers for resins and nitro cellulose. Applicant claims no specific proportions and so far as the claims are concerned would include proportions such as 99% resin and one per cent of solvent which apparently would not be useful.

Examiner.

Defendant's Exhibit E.

11/E/Lea

JAN 16 35



Div. 64 Room 4708
ALBERT E. GESSLER
PRINTING INK AND METHOD
OF UTILIZING SAME
Serial No. 622,453
Filed July 14, 1932.

New York, January 15, 1935.

HON. COMMISSIONER OF PATENTS,
Washington, D. C.

Sir:-

Replying to Official Letter dated November 27, 1934, applicant amends as follows:

Specification, page 1, between lines 7 and 8, insert the following:

In referring to printing inks in the specification and claims, I refer to compositions of heavy consistency used for commercial printing and not to plastic, thermoplastic, liquid, semi-liquid marking or ornamental transfer compositions which require special equipment differing from the standard plate and roller construction required for general printing purposes. Printing inks invariably are characterized by a relatively high viscosity obtained either by the polymerization of the oils by heating or by thickening by dissolving solid substances therein in order to effect well recognized qualities of tack, viscosity and heavy consistency peculiar to these printing inks, and necessary to such inks in order to enable them to be properly spread upon the plates and rollers of the printing press. These characteristics are in sharp contrast to those of special purpose marking compounds, which cannot be used on standard printing presses. It should be understood, therefore, that all compositions capable of leaving a substantially permanent mark upon a surface are not to be classed as printing inks contemplated under the present invention, unless their purpose, function and result are in line with those desired in the art of commercial printing.

62 - 53

Defendant's Exhibit E.

Page 1 line 8, after "inks" insert of the type so identified; line 10, change "due to" to depending upon .

Page 2 lines 9 and 29, cancel "neutral".

Page 3 line 23, rewrite amendment A- as follows:

Certain high boiling point solvents of the nature alluded to are unique also in that they not only serve to plasticize the gummy film obtained after the main solvent has evaporated, but they also exert a solvent action upon the cellulose compound or natural or syntaetic resin sought to be dissolved. Such solvents do not evaporate upon heating the compound, for they boil at considerably higher temperatures than are necessary to drive off the main solvent.

Page 4 line 5, delete the period after "drying" and add that are solid, coherent and non-sticky when solvent free.

Page 5 line 5, after "print" insert

The ink is substantially non-absorbable, does not "halo" and is not subject to "livering" or other forms of instability. The term "haloing" is a term used in the printing ink art to characterize the tendency of the vehicle of an ink to move outwardly from the print, after it has been applied. The term "livering" is used to denote the property of an ink to deteriorate and lose its characteristic consistency of body and viscosity, as by the separation or coagulation of some of the constituents of the ink after a period of standing. The prints made by the novel ink do not become so brittle that an over-print cannot later be impressed upon them. The ink does not strike through the paper to which it is applied.

Page 6 line 8, after "grease" insert in the printing,

Defendant's Exhibit E.

"The" and insert: successive sheets of printed material will not offset or stick together but the; last line, after "surface" delete the period and add in which it is first applied.

Claims 11 and 14, line 8 of each claim, cancel "neutral"; same lines after "resins" insert that are solid, coherent and non-sticky when solvent free.

Claims 11, 14 and 15, lines 7 and 8 of each claim, cancel "as contrasted with the characteristically low concentration of a lacquer".

Claims 13 and 15, line 4 of each claim, cancel "neutral".

Claims 13, 16 and 17, lines 6 and 7 of each claim, cancel "as contrasted with the characteristically low concentration of a lacquer".

Claim 12 line 4, after "esters" delete the comma and insert that are solid, coherent and non-sticky when solvent free.

Claim 13 line 3, after "resin" insert that is solid, coherent and non-sticky when solvent free; lines 5 and 6, cancel "as contrasted with the characteristically low concentration of a lacquer".

Claim 16 line 5, and claims 18, 19 and 32, line 4 of each claim, after "resins" insert that are solid, coherent and non-sticky when solvent free.

Claim 32 line 5, change "same" to vehicle.

Claim 17 line 4, after "esters" delete the comma and insert that are solid, coherent and non-sticky when solvent free.

Claims 21, 22, 26, 27, 29, 31, line 3 of each claim, after "resins" add that are solid, coherent and non-sticky when solvent free.

Claim 20 line 4, change "liquid composition having" to heavy consistency carrying.

Claim 22 line 4, after "high" add and being present in quantity sufficient; line 5, change "same" to vehicle.

Claims 26, 27 and 29, line 4 of each claim, after "temperatures" insert and being present in quantity.

Defendant's Exhibit E.

Claim 32, line 5, after "temperatures" insert and being present in quantity.

Add the following claims:

33. A printing ink having a heavy tacky consistency comprising a coloring material incorporated in a vehicle made up from a material of the group comprising cellulose compounds and resins that are solid, coherent and non-sticky when solvent free, dissolved in solvents which are substantially non-drying at room temperatures, but which have a vapor pressure at elevated temperatures sufficient to cause the rapid evaporation of such solvent, said solvents imparting to the ink the property of instantaneous drying from a thin film solely by the evaporation of such solvents upon elevation of temperatures.

34. A printing ink having a heavy tacky consistency comprising a coloring material incorporated in a vehicle made up from a solid, coherent, non-sticky and solvent free material of the group comprising cellulose compounds and resins, dissolved in a solvent which is substantially non-drying at room temperatures, but that evaporates rapidly at elevated temperatures, said solvent imparting to the ink the property of instantaneous drying from a thin film solely by the evaporation of such solvent at elevated temperatures.

35. A printing ink having a heavy tacky consistency comprising a coloring material incorporated in a vehicle made up from a solid, coherent, non-sticky and solvent free material of the group comprising cellulose compounds and resins, dissolved in a solvent which is substantially non-drying at room temperatures, but that evaporates rapidly at elevated temperatures; said vehicle being substantially free from highly volatile solvents and driers, and having the property of hardening a thin film of the ink instantaneously upon the elevation of the temperature sufficiently to drive off said solvent.

Defendant's Exhibit E.

36. A printing ink having a heavy tacky consistency comprising a coloring material incorporated in a vehicle made up from a solid, coherent, non-sticky and solvent free material of the group comprising cellulose compounds and resins, dissolved in a solvent which is substantially non-drying at room temperatures, but that evaporates rapidly at elevated temperatures, said vehicle being substantially free from highly volatile solvents and driers but containing a plasticizer, and having the property of hardening a thin film of the ink instantaneously only upon the elevation of the temperature sufficiently to drive off said solvent.

37. A printing ink having a heavy tacky consistency comprising a coloring material incorporated in a vehicle made up from a material of the group comprising cellulose compounds and resins that are solid, coherent and non-sticky when solvent free, dissolved in solvents having a vapor pressure at room temperatures of approximately .05 millimeters of mercury but having a vapor pressure at elevated temperatures sufficiently high to cause rapid evaporation of the solvent, said ink being substantially free from solvents tending to evaporate to any considerable extent at room temperatures, the drying of said ink being governed solely by the aforesaid characteristics of said solvents.

38. A printing ink having the heavy, tacky consistency of the ink required by the standard plate or rotary presses used in commercial printing, said ink comprising a coloring material incorporated in a vehicle made up from a material of the group comprising cellulose compounds and resins that are solid, coherent and non-sticky when solvent free, dissolved in solvents having a vapor pressure at room temperatures of approximately .05 millimeters of mercury but having a vapor pressure at elevated temperatures sufficiently high to cause rapid evaporation of the solvent, said ink being substantially free from solvents tending to evaporate to any considerable extent at room temperatures, the drying of the ink being governed solely by the aforesaid vapor pressure characteristics of said solvents.

Defendant's Exhibit E.

39. A printing ink having the property of being practically instantaneously dried from a thin film solely by the evaporation of its solvents upon heating, consisting of a pigment, incorporated in a varnish comprising a solvent with a vapor pressure which causes such varnish to remain in its original state of viscosity indefinitely at room temperatures, and material of the group comprising cellulose compounds and resins that become solid, coherent and non-sticky on evaporation of the solvent, said solvent having the additional property of rapid evaporation at elevated temperatures.

40. A printing ink of heavy, tacky consistency having the property of remaining in its original physical condition under the usual conditions to which printing inks are exposed but having the property of instantaneously drying from a thin film on application of heat and thereby immediately forming a solid, coherent and non-sticky print, said ink comprising a material of the group comprising cellulose compounds and resins dissolved in solvents that are substantially non-drying at room temperatures but that evaporate rapidly at elevated temperatures.

41. A printing ink comprising a coloring material incorporated in a non-oxidizable vehicle comprising a cellulose compound dissolved in solvents that are substantially non-drying at room temperatures but which are rapidly vaporizable at elevated temperatures, said vehicle being thereby adapted to dry solely by evaporation when subjected to heat.

Cancel claims 24, 25 and 28.

Defendant's Exhibit E.

REMARKS.

During a recent interview which the Examiner very kindly accorded the attorney of record, four patents to McElroy, two to Doughty and one to Schneider were produced as including subject matter anticipatory of the present invention. These patents have now been studied carefully and although their teaching has been found to differ widely from that which must be credited to the present applicant, some of the claims have been amended to remove any doubt as to the line of demarcation between these patents and the present invention. The patents are discussed below.

Schneider No. 1,966,907 is directed to the art of imitation engraving secured by printing with a non-drying ink which contains dibutyl phthalate and a resin as a vehicle. After applying the vehicle he sprinkles it with powdered shellac, which is partially dissolved by the solvent in the vehicle, and causes the shellac to penetrate the vehicle and the paper. Then he heats the assembly to 100° to 150° C. to fuse the shellac and to cause the moisture of the ink to be absorbed by the shellac instead of being evaporated.

Dibutyl phthalate has a vapor pressure at 200° C. of only 10 mm. In either applicant's process or in Schneider's process this solvent would not evaporate quickly, as its vapor pressure even at temperatures as high as 200° C. is 750 mm. below the point of rapid volatilization usually designated as the boiling point. Schneider fully realizes this and provides for the taking up of the solvent by absorption into the shellac and expressly states (page 2 lines 51-53) --

> "when the shellac is fused the moisture of the ink is absorbed by the powder instead of being evaporated".

Defendant's Exhibit E.

In contrast with this, applicant avoids the use of this solvent except as a plasticizer or repressing agent and chooses instead a solvent which will actually evaporate and will rapidly evaporate at elevated temperatures. This rapid evaporation is essential in applicant's process and the presence of the solvent which will not evaporate at room temperatures and which will rapidly evaporate on elevation of temperatures is essential to his product. As Schneider does not desire this result, does not operate his process to obtain it, and did not propose to obtain it, he certainly cannot be held to anticipate that which the present applicant has contributed. Nowhere does Schneider mention a solvent equivalent to applicant's solvents, and it is very plain that if he had suggested it or had used it, his whole invention would have been rendered inoperative for in his process this solvent would evaporate long before it had an opportunity to penetrate the paper and to secure the result which he had in mind.

Applicant's claims all distinguish his invention from that of Schneider. Even the broadest claims call for a solvent or solvents having a vapor pressure at elevated temperatures sufficient to cause the ink to dry rapidly by evaporation, and such materials are not remotely suggested by the reference. If Schneider desired to dry his composition by evaporation he would have to raise the temperature so high that he would burn his paper.

In considering the McElroy and Doughty patents, it will be well here to refresh our recollection of the fundamental principle which underlies the present invention. In commercial printing it is necessary to produce an impression which will be dry and permanent, and

Defendant's Exhibit E.

will not smudge when handled or rubbed against a foreign surface. According to the invention this is accomplished by evaporation of the solvent of the vehicle of the ink, instead of by the old method of relying upon the slow oxidation or polymerization of the vehicle or upon its absorption into the paper. It is apparent, therefore, that when the solvent has been evaporated the residue must be immediately firm, solid, coherent and non-sticky, and such result can be achieved only by the use of solid substances which are not powdery or sticky in this condition. Thus, applicant, in broadly adverting to low viscosity materials selected from the group comprising cellulose compounds and resins, has taken it for granted that members of this group which are solid, coherent and non-sticky when free of solvent will be chosen. Those not having these characteristics are useless, and as hereinafter pointed out, the McElroy and Doughty gums and resins, useful though they may be in their limited field of metallic book stamping ink, are of no value to applicant. They have not taught applicant or anyone else the principle of the present invention because these materials are normally either gummy and sticky, or else powdery and lacking in coherence. They are not solid, coherent and non-sticky when free of solvent. They will not become solid and coherent merely upon the evaporation of the solvent with which they were dissolved and are, therefore, totally unsuitable for use in a commercial printing ink to produce a hard, coherent, flexible, dry, adherent print by the evaporation of their solvent.

With this in mind we can readily perceive that McElroy No. 1,489,386 relates to a special metallic pigment ink for embossing or stamping titles on book cloth, leather, etc. McElroy uses "ester gum".

Defendant's Exhibit E.

an esterified white rosin which is brittle and powdery at room temperatures and, therefore, unsuitable for the production of a hard elastic film by solvent evaporation merely. Such a gum is fused at high temperatures and must be entirely cooled before it hardens, and it is quite apparent that it could not be used for continuous printing as it would not only be soft and would smear long after heat had been applied to it, but it would, once cooling had been effected, become hard and brittle. It cannot produce a hard, coherent, flexible, firmly adhering printing such as that produced by the ink of the present invention.

McElroy uses heated type or dies designed to supply a temperature of 500° F., which high temperature is necessary to give a metallic luster to his metal pigment, and necessary also to drive off sufficient quantities of solvent so that a print may be applied. This temperature is much higher than that which could be used in the successful operation of applicant's process; in fact, it would make the process unworkable and would burn the paper on which the print was made. Applicant prints at room temperatures and the consistency of his ink is constant.

It is significant that McElroy uses only 10% gum with 84% terpineol as his vehicle, which he mixes with two parts of bronze powder to one of gum solution. This gives a liquid composition which flows and has no similarity to a printing ink in general characteristics of consistency or specific characteristics of tack and viscosity. McElroy's vehicle contains less than one-half the amount of dissolved substances that applicant's contains and it is not surprising that McElroy obtains a light liquid consistency differing greatly from a printing ink in physical characteristics, and unusable as such. McElroy agrees with this, for he expressly describes his composition as semi-liquid.

Defendant's Exhibit E.

It is apparent, therefore, that applicant's ink would not work on McElroy's press because the ink would immediately cake and dry on the heated dies, and McElroy's ink would not work on the ordinary printing equipment contemplated by applicant because the composition of McElroy is not of sufficiently heavy consistency enough to enable it to be handled like ordinary printing ink. In other words it does not possess the qualities of tack and viscosity of printing ink, and does not meet applicant's claims either in terms or in teaching.

The real teaching of McElroy is concerned with metallic inks only, the metal pigments of which would corrode and tarnish if acid materials were used to compound them. McElroy wants a lustrous finish which he cannot obtain if his metallic pigments become tarnished. To prevent corrosion and tarnishing, McElroy uses a non-acidic binder, -- esterified white rosin -- and a solvent neutral as to acidity -- terpineol. These concepts are far removed from those underlying the present invention. Applicant is not concerned with acidity and need not choose special materials of non-acidic nature. He does not require metallic pigments, and does not require a lustrous print. He does not produce an unstable composition in which the color settles, as is the case with McElroy's metal powders. He does not use sticky resins which will smear in an ink film unless and until thoroughly cooled and hardened; nor does he use brittle powdery material that will crack and crumble when cooled to normal temperatures. He does not contemplate, nor could he utilize, a hot die apparatus for applying his ink. Moreover, terpineol, the solvent of McElroy, is not a good solvent for hard resins and cellulose compounds and would not, even if McElroy had desired it to do so, dissolve them in sufficient amounts to give the consistency desired for printing inks.

Defendant's Exhibit E.

These many points of distinction show clearly the complete inadequacy of the McElroy teaching to anticipate that of the present applicant.

In his next patent, No. 1,450,692, McElroy follows out the same general ideas of his former one but suggests "Cumar" resin as a binder and pine oil and rosin oil as solvents. Cumar resin can be obtained in solid or liquid state, but even the solid forms are sticky at room temperatures and must be chilled to reduce them to powder as McElroy prescribes. Such a resin is, therefore, unsuitable for use in a printing ink designed to produce a rapidly drying film by evaporation alone. The proportions of ingredients are substantially the same as set forth in the former patent, there being only 16% resin in the vehicle, an amount totally insufficient to give the characteristics of tack and viscosity of a printing ink.

McElroy No. 1,489,357 is specific to his particular composition and for this reason was taken as one which would, if followed closely, produce a product with which applicant's product might be compared. Accordingly, tests following the McElroy patent precisely, using the exact percentages of material recommended by the patentee, were carried out and the results showed a composition of a liquid consistency, far too liquid to approach the tackiness and viscosity of a normal printing ink and far too liquid to be capable to use with the usual printing equipment for commercial printing upon paper.

The results of these tests and the comparison of the McElroy composition with that of Gessler are described in the affidavits of Dr. F. G. Zinsser and Dr. Alfred Burger which accompany the present amendment. These show conclusively that the McElroy metallic ink is really not comparable with that of the present invention in physical characteristics, and the proper tack and viscosity, which are the main factors determining the consistency of the ink, can be obtained in McElroy's ink only if at least seventeen times as much resin is used; and

Defendant's Exhibit E.

even if this were done, the stickiness inherent in the hot composition, containing as it does fused Cumar resin, would make it impossible to print consecutively with it, a test which, naturally, must be passed in order that any product might qualify as a substitute for applicant's composition. McElroy himself warns against the use of 20% Cumar or over as it tends to clog the impression member of his particular apparatus. In sharp contrast, applicant cannot use as little as 20% solids, and produces a composition in which he may use 35% dissolved substances, as shown by his illustrative example using nitrocellulose. Thus, it is apparent that McElroy has entirely insufficient dissolved solid substances to give him the characteristics applicant desires, and if McElroy increased his solids concentration, he would render his composition inoperable even for the purpose for which he himself designed it. McElroy himself warns against such increase.

The exhibits accompanying the affidavits show very convincingly the heavy tacky consistency of an ordinary printing ink and the light, liquid consistency of the McElroy stamping composition. If the Examiner will spread samples of these inks on a piece of paper, he will readily perceive how the liquid ink, which represents the consistency of McElroy's ink as well as many other types of special inks, could not be spread upon the plates of the press. He will also observe how the vehicle strikes through and stains the other side of the paper and how it tends to "halo" and how the metal pigment settles to the bottom and necessitates remixing. Certainly, applicant is claiming very definite physical attributes and characteristics.

The other McElroy patent No. 1,471,746 merely serves to emphasize the fact that this patentee has taught the production only of a special gold color or other metallic pigment ink which must be used with a special neutral vehicle and a neutral binder in a special heated-die type of printing equipment. With the cellulose compounds and resins that may be acidic, his composition would not work and he

has taught the art nothing as to the behavior and the treatment of non-metallic pigments and materials of the group comprising cellulose compounds and resins that are solid, coherent and non-sticky when free of solvent, for use with commercial printing processes and equipment.

The Doughty patents Nos. 1,439,695 and 1,439,696 are directed to subject matter very similar to that of the McElroy patents and were issued to the same assignee. The first Doughty patent was filed before the first McElroy patent and quite plainly chronicles the initial development of the book-binding printing to which all the patents are directed. This is plain when it is considered that the Doughty patents do not allude to neutrality in any of his constituents -- the pigment solvent or binder -- and, although some of the solvents mentioned by him are within the group subsequently identified by McElroy as neutral solvents, many of the solvents mentioned contain acid radicals and are acid in nature and would not work according to the later and accepted theories of McElroy. The binder or thickening agents suggested by Doughty are rosin, dammar, copal, Burgundy pitch, Canada balsam, etc., which are not solid, coherent and non-sticky when free of solvent at or above room temperatures. Moreover, the ratio of gum to solvent is 1 to 4 and yields a light consistency sharply distinguishable from that of the printing ink as defined by applicant. Doughty's work, therefore, is significant only to show still more clearly the fact that this special metallic book-binding printing composition is limited in its application to the specific problems which were confronted in that art, and that neither Doughty nor McElroy contributed anything of value to the art of standard commercial printing.

At the interview above alluded to, the Examiner suggested the limitation of applicant's claims to a specific proportion of ingredients used. But a review of the art in contemplation at that time shows quite plainly that applicant should not be required to so limit his

claims. Such changes in the claims as have been made in the present amendment have been made merely to remove the possibility of doubt as to the distinctions between the invention and the work of Doughty and McElroy, and in view of the foregoing remarks it is felt that the Examiner will readily perceive the existence of these important and practical differences.

The foregoing amendments and remarks were prepared prior to the receipt of the Official Action of November 27, 1934, in which it was noted that the Examiner concluded not to cite the McElroy patents. Owing to their similarity to Doughty, the foregoing has not been changed and the remarks directed to McElroy have been retained in this amendment with the request that the Examiner consider them in connection with the Doughty patents. Attention is particularly directed to the fact that the addition of rosin oil to the solvent, while not suggested by Doughty, is more favorable to Doughty as an anticipatory reference, for it serves to some extent as a plasticizer (according to McElroy) and, therefore, supplies to Doughty an element which he lacks. Attention is also directed to the fact that rosin, the gum of Doughty, is sticky, when free of solvent, and, therefore, quite as unsuited as those of McElroy for the formation of a print by evaporation of a solvent merely. Moreover, Doughty uses 4 parts solvent to one of rosin and the consistency of his composition is undoubtedly just as liquid as McElroy's.

In the action of November 27th, Lawrence No. 1,984,480 is again applied to the claims. With a view toward finally disposing of this reference, the Examiner's attention is directed to the following points:

(1) Lawrence's composition is a transfer ink of a peculiar type and not a printing ink. The specification has now been amended to

define what applicant means by a printing ink and in the light of this definition it is believed that the inadequacy of compositions like those of Lawrence to anticipate the purpose, function and result of applicant's printing ink will be unmistakable.

(2) Most of applicant's claims require his cellulose compounds or resins to be dissolved in his solvents in sufficient concentration to produce the normal qualities of tack and viscosity of a printing ink. This, of course, refers to the qualities of the ink at room temperatures, and if the Examiner requires it, this limitation might be expressly included. Lawrence's composition does not meet these requirements, for at room temperatures his composition is a solid cake, by reason of the large amount of solids and small amount of solvent which he uses. Thus, Lawrence, unlike McIlroy, Doughty, Reese, etc., goes too far on the score of solids concentration and produces a composition that at room temperatures is so thick that it could not be used as a printing ink. But Lawrence can afford to retain these characteristics, for his composition is thermoplastic and he knows he must heat it to 100° C. to print his transfer. Applicant could not print at 100° C. with applicant's ink by Lawrence's process any more than Lawrence could print with Lawrence's ink at room temperatures by applicant's process. Lawrence's idea is adapted solely to the hot printing of ornamental transfers which is entirely non-analogous to the art of commercial printing at room temperatures, with which art applicant is concerned. The respective processes are mutually exclusive as are the products which are used.

(3) Lawrence contemplates only a small proportion of solvent in his composition and this is one reason why his composition is too stiff to print with at room temperatures. Even with his hot printing he states that it requires ¾ hours to evaporate sufficiently, and even then the result is a plastic composition or transfer which must remain heated in the operation of transferring the design to the fabric

or other medium to which it is adapted to be fixed permanently. The fact is that Lawrence wants his composition to remain plastic on his transfer sheet, and that he does not want it to dry and, as he uses considerable quantities of lithographic varnish and oxidizable oils, it is apparent that he relies partly on the oxidation or polymerization of these oils and it is not possible to dry his ink by the evaporation of the solvent merely. Obviously, this is not the way applicant's ink works; it is not the way it is intended to work and it does not give the results applicant has in mind. The teaching of Lawrence is not such as would aid the art of commercial printing at all, much less is it sufficient to anticipate the real contribution that applicant has made to that art.

(4) This brings up the disclosure of Lawrence of the use of butyl carbitol. To be sure, as the Examiner has stated, he has mentioned this solvent, but what has he really taught as to its use in a printing ink? Lawrence says it is desirable because it does not evaporate rapidly at 100° C. Applicant uses it because he knows it does evaporate rapidly at 100° C. and higher, especially from the thin film of an applied print. Applicant has not obtained any benefit from Lawrence in this respect, for had he followed Lawrence's teaching he would have been entirely misled. Thus, according to Lawrence, butyl carbitol was not a solvent which would meet applicant's requirements and the very reason Lawrence advances to its desirability is precisely the reason why, were it true, applicant would avoid it.

It is felt that the Examiner is too readily relying for anticipation upon the mere mention in prior patents of the specific ingredients of applicant's ink, without consideration of the purpose and function of these ingredients, the manner in which they have been associated and the results obtained. Lawrence is sufficient only to show that butyl carbitol and a resin have been included in a composition of the transfer

ink type, and this is not what applicant has invented nor what he is claiming.

Although applicant has scrutinized the Davidson article for a disclosure of diethylene glycol butyl ether as a solvent for both resin and nitrocellulose and has been unable to find it, he is ready to concede that this chemical was known to have these solvent properties. But as will be seen hereinafter, neither Davidson nor anyone else knew how to utilize them to make a printing ink like applicant's.

Middleton has a special film-marking composition in which he uses many times more solvent than necessary, required or possible in applicant's ink. The concentration of Middleton's ink is entirely too low. He mentions various solvents including ethylene glycol monoethyl ether which, as has previously been indicated, possess far too high a vapor pressure at room temperatures for use in applicant's product. Middleton uses this solvent because of its highly desirable drying qualities (Middleton page 1 line 96), and it is apparent that this solvent is not substantially non-drying at room temperatures. Middleton does not suggest solvents, like diethylene glycol butyl ether, which have the vapor pressure characteristics desired or claimed.

Fleischmann discloses an intaglio printing color in which he mixes certain peculiar resins with volatile organic solvents. He suggests the incorporation of a little nitrocellulose and other compounds in addition to these resins. But nowhere does he suggest heating the colors to dry them by evaporation, and from the nature of the solvents employed it is apparent that they are all highly volatile and possess such high vapor pressure at room temperatures that he would not need any heat to accelerate evaporation, and it is apparent that should he use heat he would only accentuate the tendency of his colors to dry before the print has been applied. Fleischmann's solvents will have vapor pressures at room temperatures far above that required in the claims. For instance, ethyl alcohol and ethyl acetate have vapor pressures at room temperatures in excess of 60 mm. of mercury, which shows that they are about 1800 times more volatile at room temperatures than the solvents which applicant has specified..

Defendant's Exhibit E.

Applicant is at a loss to know how the various comments of the Examiner in reference to Davidson, Middleton and Fleischmann, sustain or improve the rejection of claims 11-17 inclusive on Lawrence, as Lawrence will still fail to meet the claims even though the various features of the other patents alluded to by the Examiner are superimposed upon it. Thus, the substitution of the nitrocellulose of Davidson's lacquers, or of Fleischmann's intaglio colors, or the shellac or sandarac of Middleton's film-marking composition, or the peculiar resins of Fleischmann's composition, for what might be equivalent substances in Lawrence's thermoplastic composition, would not yield applicant's product as described or claimed, for no reference suggests making a printing ink by dissolving the solids in a solvent of the class specified by applicant in sufficient concentration to give the normal qualities of tack and viscosity of a printing ink, as defined. The result of such substitution will be far different from that which applicant has achieved and that which he has claimed.

Thus, applicant will concede that Lawrence, Davidson, (assuming Davidson disclosed butyl carbitol), Middleton and Fleischmann each mentioned a specific substance, or suggested a solvent for some particular transfer ink, brushing lacquer, moving picture film marking composition, or intaglio color, each of which is either of a different consistancy from that of ordinary printing inks, or possesses different drying characteristics from those of applicant's product. But it is not conceded that the Examiner is justified in applying these independent suggestions to the novel combination described and claimed in the present application, or in doing so, that he has shown anticipation. For the references relate but remotely to the applicant's invention and from none of them is it possible to gain a comprehensive view of applicant's achievement in combining all these separate factors into a new and useful result. It is only in the light of applicant's own disclosure that the Examiner is able to reconstruct the invention by piecing together these prior art patents and publications. This is thought to be improper, unfair and not in accord with the osteblished practice of the Patent Office.

Defendant's Exhibit E.

As to the Examiner's holding that the selection of the substances with which applicant constructed his ink was a matter of choice, it is submitted that this is true of every invention. The important thing is whether the correct choice was made and success achieved. Applicant has made the correct choice and the correct correlation of factors in view of the many requirements of the printing ink art. He has produced a new and useful result which the prior art fails to show has been produced.

Goodyear chose sulfur with which to heat rubber, -- a good choice because he produced vulcanization. Sulfur was old, rubber was old, and heating was old, but vulcanized rubber was new. Baekeland did not discover that a condensation product of formaldehyde and phenol could be obtained, for it was well known that an infusible, insoluble, porous composition, full of water bubbles could be produced with these substances. But Baekeland found that by controlling the conditions of reaction he could delay the solidification of the product, and in the meantime could rid it of its water and mould it into any desired shape. The regulation of these conditions was a matter of choice, even with Baekeland. Everything is a matter of choice but it is the wise and successful choice in producing a new and useful result that the patent statutes were designed to reward. It is submitted that applicant's choice is such.

As to the rejection of the first seven claims as met by Schneider No. 1,966,907; it is pointed out that Schneider has already been fully discussed and distinguished and will not again be discussed. The fundamental trouble with Schneider, so far as anticipation is concerned, is that he uses such low vapor pressure solvents that he can't possibly obtain quick drying by evaporation and must rely on the absorption principle. As to the other references used by the Examiner to support Schneider as an anticipation, it is conceded that dibutyl phthalate has a very low vapor pressure at room temperatures. But neither these

Defendant's Exhibit E.

Nor 1,924,961 nor Circular [illegible] page [illegible] [illegible] to use it in a printing ink along with other materials which have different properties and functions, and in which the properties and functions of the total number of individual ingredients coact and co-operate to give a printing ink which is new and useful in its construction, operation and result, as described and claimed by applicant. Reese's bonding medium is of no assistance as it is not a printing ink and has not a printing ink consistency, but a liquid consistency that precludes its use as such.

As has been previously pointed out, Reese is concerned with the formation of a bonding medium for use in a special process of making ornamental transfers. In this medium, it is true, he calls for the use of a low vapor pressure solvent. But the fact that he mentions butyl carbitol in one of his illustrative compositions is of no anticipatory significance so far as the present invention is concerned, for his bonding material is sprayed on by spraying machine 9 through nozzles 11. The bonding medium of Reese clearly is not a printing ink and does not and cannot possess the qualities of tack and viscosity of a printing ink.

Reese's decorative films, as distinguished from his bonding medium, all contain high vapor pressure solvents, and are all lacquer type films which are prepared from lacquer-like liquids which likewise do not possess the qualities of tack and viscosity -- the heavy consistency -- of a printing ink. The purpose of Reese is to provide a special bonding medium which will cause the superimposed decoration to adhere, and to provide an interrelation between the two films that will allow the low vapor pressure solvents of the bonding medium to exert a solvent action on the coating and thus to provide a means of escape of the volatilized solvents. This may be and probably is an ingenious idea in the art of ornamental transfers, but it is in no sense related to the inventive concepts of the present application.

As to claims 12, 15 and 17, the Examiner is again reminded that the substitution of a cellulose ester in the place of Schneider's

resin will not give applicant's ink as claimed in these claims or in any of the other claims, and such a substitution in the place of Lewrence's ozokerite, Amberol or Cumar will not give the ink of claim 20 or claim 32 or of any of the other claims. The compositions of the patents fail to meet the terms or the substance of the claims and even though their various ingredients are intersubstituted they do not disclose the printing ink claimed. No single reference gives a proper outline of fundamentals which would warrant the substitution of elements from other sources. There is no basic anticipatory reference.

It is respectfully pointed out that the products to which the Examiner refers in the various references are so unlike that of the present invention that the latter is made all the more outstanding and obvious. In each reference, although there is disclosed some one or two of the ingredients which the applicant has found it desirable to use, the patentees use such other and different ingredients or such other and different steps that the result in each is entirely different from that sought and achieved by this applicant. This is true of the patentees' disclosures independently or as modified by the Examiner, and a recognition of this fact should leave no doubt that what applicant has disclosed is not anticipated. It might be well to remember also that none of the patentees was the first to discover the various gums and solvents used by them, yet their different purposes, functions and results were recognized by the issue of separate patents to them.

Claims 21, 22, 23, 26, 27, 29, 30 and 31 are stated by the Examiner to be drawn merely to a constituent of an ink and are rejected on Lawrence 1,954,450, or Schneider. The claims, it is true, are drawn to cover the vehicle of an ink but if such vehicle constitutes new composition of matter there should be no objection to claiming the same. It is felt that claims to the vehicle represent a perfectly proper subcombination under the combination representing the ink. Lawrence does

not meet the claims because (1) he does not have a printing ink and, therefore, has no printing ink vehicle; (2) he does not use material selected from the group comprising cellulose compounds and resins that are solid, coherent and non-sticky at room temperatures, but uses waxy ozokerite or sticky Cumar resin; (3) his marking composition contains lithographic varnishes and dryers and, therefore, relies upon oxidation or polymerization rather than upon evaporation; (4) the solvents are not present in sufficient quantity to cause the vehicle rapidly to vaporize and thereby quickly to dry the vehicle by evaporation on the application of heat; (5) the vehicle contains no solvent which has no appreciable vapor pressure at room temperatures. These features of differentiation apply to the broader claims of the group, the more specific claims, such as claims 25 and 30, being clearly not met by the Lawrence patent which does not remotely suggest a vehicle for printing ink comprising nitrocellulose dissolved in diethylene glycol butyl ether with or without the admixture of dibutyl phthalate.

The claims mentioned in the preceding paragraph are also entirely free from anticipation by the Schneider patent in the following matters:

(1) The resin of Schneider (paracumarone) is a cumerone resin and is not one of the group which are solid, coherent and non-sticky when free of solvent at or above room temperatures.

(2) This resin is not dissolved in solvents having a vapor pressure at elevated temperatures sufficient to cause the same rapidly to vaporize and thereby quickly to dry the vehicle by evaporation.

(3) The solvent of Schneider does not have a vapor pressure at room temperatures of approximately .05 mm. of mercury but has practically no vapor pressure at all at these temperatures.

(4) There being no solvent having the specified vapor pressure at elevated temperature, there is, of course, no basis of anticipation for the requirement that this solvent be present in quantities suf-

ficient to cause the vehicle to dry rapidly by evaporation. It is pointed out also that Schneider, like Lawrence, adds a dryer to his composition, a component which applicant expressly seeks to avoid.

The Reese patent, although containing some illustrative compositions of his bonding medium containing nitrocellulose and butyl carbitol, does not meet claims 21, 22, 23, 26, 27, 29, 30 and 31, because of the following facts:

(1) Reese's bonding medium is not a vehicle for printing ink, as claimed.

(2) His butyl carbitol is not present in quantity sufficient to cause the vehicle rapidly to vaporize and thereby to dry the vehicle by evaporation upon the application of heat, as called for in the claims.

(3) The vehicle, containing as it does volatile solvents like ethyl acetate, butanol and toluol, is not, as required by the claims, sufficiently free from highly volatile solvents as to be substantially non-drying at room temperatures and, as previously emphasized, the Reese product is designed for so different a purpose and gives so different a result that it in fact constitutes a non-analogous art.

It is observed by the Examiner that applicant claims no specific proportions and, so far as the claims are concerned, a composition consisting of 99% resin and 1% solvent would be included and that such a composition would not be useful. It is pointed out that the claims are not broad enough to cover such a wide range as they either call for an ink in which the stated solid materials are dissolved in sufficient concentration to produce the normal qualities of tack and viscosity of a printing ink, - a definite and known standard of consistency which could not be obtained with 99% resin and 1% solvent: or

a vehicle in which the dissolved substances are dissolved in a solvent which is present in sufficient quantity to cause the ink to dry rapidly by evaporation. Moreover, a composition such as supposed by the Examiner would not constitute a printing ink or vehicle therefor, and accordingly would be excluded at the outset from every claim which this applicant has made.

It is unreasonable to suppose that the 22 references cited and referred to by the Examiner during the prosecution of this case, or even the seven references cited in the last action, anticipate the invention of this applicant. If this were true, the references would anticipate each other and most of them should never have been issued. If the Examiner cannot produce a basic reference showing applicant's product or its equivalent, it is submitted that he cannot show anticipation and should allow the claims.

If any one of the patents contained a disclosure of a printing ink in which a resin that was solid, coherent and non-sticky when solvent free, was dissolved in a solvent in sufficient concentration to produce the normal qualities of consistency of a printing ink, and in which the solvent had the vapor pressure characteristics required by the claims, and was present in quantity sufficient to cause the vehicle t dry rapidly by evaporation at elevated temperatures, -- then, it would be conceded, the substitution of nitrocellulose for such a resin would not involve invention. But this is not the case and no reference contains a disclosure sufficient to make it fundamentally anticipatory, and there is no justification for the substitution of equivalents in a disclosure that does not contain all the basic elements of the combination associated together in the manner specified in the claims.

New claims 33 to 41 have been added after a thorough consideration of the whole art cited, in an effort to define the invention more clearly. These claims are all distinguishable from the art in one or more respects, and as the points of distinction have been fully explained, it it unnecessary to take up the claims in detail.

Defendant's Exhibit E.

While it is not the purpose of applicant to burden the Office with too lengthy an amendment and argument, the foregoing rather voluminous material has been necessitated by the Examiner's wholesale combination and association of references in each of the stated grounds of rejection, thus necessitating an analysis of each reference in order to reach proper conclusions as to what each reference does and does not disclose or suggest, and further necessitating a comparison of these disclosures or suggestions with those of applicant, and an application thereof to the claims. It is felt, however, that the argument meets every objection that has been raised and that applicant has successfully carried the heavy burden which has been imposed upon him, -- a burden that derives its weight from the number of references applied rather than from the substance of these references.

Favorable reconsideration is thought to be in order.

Respectfully submitted,

Attorney for Applicant.

Defendant's Exhibit E.

Div. [illegible] Room 4708
ALBERT E. GESSLER
PRINTING INK AND METHOD
OF [illegible]
Serial No. 62[illegible]
Filed July 14, 1932.

STATE OF NEW YORK)
) SS.:
COUNTY OF NEW YORK.)

FREDERICK G. ZINSSER, being duly sworn, says:

That he is Chairman of Zinsser & Co. Inc., manufacturers of fine chemicals, photographic developers, dyestuffs, and dry colors, at Hastings-on-Hudson, County of Westchester, State of New York; that he has been engaged in the manufacture of chemicals since 1892.

That his educational qualifications as a chemist are as follows: He attended Columbia University School of Mines from 1884 to 1886; that he then studied at the University of Louvain, Belgium, during the years 1887 and 1888, and during that time was assistant to Prof. [illegible], Professor of chemistry of Louvain and Board of Health chemist for the Kingdom of Belgium. That he studied at the University of Goettingen in Germany in 1889 and 1890, and while there worked under Dr. Victor Meyer. That in 1890 Dr. Meyer migrated to the University of Heidelberg, Germany, and that deponent went with him to that university and continued his studies under him during the years 1890 and 1891. That deponent received the degree of Doctor of Philosophy in Chemistry from the University of Heidelberg. That thereafter deponent returned to the United States and during the period of 1892 to 1896 was engaged as factory superintendent in the manufacture of varnishes, paints and similar supplies. That in 1897 deponent established the firm of Zinsser & Co. at Hastings-on-Hudson, County of Westchester, State of New York. That since that time and down to date he has been connected with this Company as a manufacturer of fine chemicals, photographic developers, dyestuffs, dry colors and printing inks.

That he has read the patents suggested by the Examiner in

Defendant's Exhibit E.

charge of Gessler application Serial No. 622,453, as follows:

McIlroy No. 1,489,356
McIlroy No. 1,489,357
McElroy No. 1,450,692
McElroy No. 1,471,746
Doughty No. 1,439,695
Doughty No. 1,439,696.

That deponent has carefully studied each of these patents and understands the art to which they relate and the processes and products disclosed therein. That deponent is also familiar with the said Gessler application for patent Serial No. 622,453 for Printing Ink and understands the process and product disclosed therein. That the Gessler invention is for a quick-drying ink adapted to print on paper in ordinary printing processes. It is suitable and, indeed, highly efficient for the printing of books, newspapers and magazines and may be used for the production of half-tones and similar pictorial work. The Doughty and McElroy inventions are wholly unsuited for any of these purposes. All six of the said patents relate to a so-called ink of the same general type, said ink being suitable for stamping leather, book-cloth, and similar materials, with a metal pigment and a binder. The binder is a gum, such as Cumar gum, neutral as to acidity, dissolved in terpineol and rosin oil.

In collaboration with Dr. Alfred Burger, who also makes an affidavit accompanying the present affidavit, deponent carried out detailed experiments to produce the product of the Doughty and McElroy patents. Deponent and Dr. Burger chose the McIlroy patent No. 1,489,357 as a typical example of the group of patents, and for the reason that this patent contains the most specific directions for the production of this special type of ink and because it was, as a consequence, the most suitable as a guide to the actual production of an ink exemplifying the work of these patentees.

90

Using the said McIlroy patent No. 1,489,357, therefore, as a guide, deponent and Dr. Burger proceeded as follows: They weighed 156.6 grams of terpineol and to it they added 8.4 grams of rosin oil, stirring

Defendant's Exhibit E.

until thoroughly mixed. These proportions constituted 95% terpineol and 5% rosin oil as called for by the patent.

They then added 32 grams of powdered "Cumar" resin to this mixture, the "Cumar" thus constituting 16% of the whole mixture of 159.6 + 8.4 + 32, or 16% of the 200 gram total, and warmed this mixture upon a water bath at 100° C., stirring meanwhile until the "Cumar" was thoroughly dissolved. After cooling the batch they took 150 grams of it and added to it 300 grams of bronze powder composed of 240 grams of No.1 (80% of the powder mixture) and 60 grams of fine bronze powder known as "lining" (the 60 grams constituting 20% of the powder mixture). The total bronze powder content was thereafter equivalent to 300/450ths or two-thirds of the whole and the vehicle content was 150/450ths or one-third of the whole, as called for by McElroy.

They stirred this mixture until the bronze powder was thoroughly incorporated. The resulting gold color stamping ink is shown in the bottle marked Exhibit A which is submitted with this affidavit and made a part hereof.

The resulting ink is of a liquid, flowable consistency differing markedly in physical characteristics from the standard printing ink used for commercial printing. Submitted herewith and made a part hereof is a one-half pound can of Sinclair & Valentine's Standard Peacock Blue Ink, marked Exhibit B, which exemplifies the normal qualities of tack and viscosity -- the heavy consistency -- of a printing ink for commercial printing equipment. This heavy, tacky consistency is required for commercial printing to enable the ink properly to be spread upon the plates and distributed over the rollers of standard printing machinery and the composition of McElroy is entirely and definitely lacking in the properties of tack, viscosity and consistency to enable it to be so used. The differences in consistency between Exhibit B and Exhibit A are plainly observable to anyone.

Also submitted herewith and made a part hereof are samples

Defendant's Exhibit E.

of red and blue inks [redacted] respectively Exhibits C and D, made in accordance with the aforementioned application of Dr. Gessler. These samples show a marked similarity in tack and viscosity with the standard ink exemplified in Exhibit B and have a similar heavy consistency. Exhibits C and D are, however, totally different from the McElroy ink of Exhibit A. The vehicle of Exhibit A strikes through the paper upon which a print has been made with it and leaves an oily outline which shows an absorption of the vehicle into the paper very much worse than that usually characterized by an ink which "halos". The McElroy ink is unstable and after a few hours the heavy metal pigment settled to the bottom.

The Cumar resin used was the most solid form of this type of resin obtainable in order to enable the patentee's instructions of preparing it in powdered form, to be carried out. Nevertheless, the resin was so sticky at room temperatures that it had to be cooled in a refrigerator to cause it to harden sufficiently to comminute it, and even then it had to be used immediately to prevent its going back to the sticky state. This resin is similar in this respect to dammar resin, Burgundy pitch, Canadian balsam, etc., referred to in the Doughty patents, and none of these gums possess the properties of solidity, coherence and lack of stickiness, that would enable them to be used in a printing ink compounded in accordance with the principles of Dr. Gessler's application. It is a fact that these resins will all fuse at the temperatures required in Dr. Gessler's process and would, therefore, not respond to a treatment designed to produce a hard flexible print merely by the evaporation of the solvent used.

Sworn to before me this)
6th day of December, 1934.) Frederick S. Zimmer

Thomas J. Huntwon

773 5x450

Defendant's Exhibit E.

Div. 64 Room 4708
ALBERT E. GESSLER
PRINTING INK AND METHOD
OF UTILIZING SAME
Serial No. 622,453
Filed July 14, 1932.

JAN 16 35
U.S. PATENT OFF.

STATE OF NEW YORK : SS.:
COUNTY OF WESTCHESTER.)

ALFRED BURGER, being duly sworn, says:-

That he is research chemist in the employ of Zinsser & Co.Inc., manufacturers of fine chemicals, photographic developers, dyestuffs, dry colors, and other similar products, at Hastings-on-Hudson, County of Westchester, State of New York.

That his educational qualifications as a chemist are as follows: That he studied at the Polytechnic Institute of Zurich, Switzerland, during 1901 and 1902. During 1902-1903 he attended the University of Basle; from 1903 to 1905 he studied at the Polytechnic Institute of Charlottenburg, Berlin, Germany. In 1905-1906 he was engaged at Clausthal, Germany, as assistant to Prof. Biltz, and in the years 1906 and 1907 he was engaged at the Sorbonne, Paris, as assistant to Prof. Urbain. That since 1907 down to date, he has been engaged in various establishments in the manufacture of pigments, ink and lacquers, and particularly as a dry color expert, and at the present time, as above stated, he is engaged with Zinsser & Co. Inc. as a dry color expert for printing inks and lacquers at the plant of that Company located at Hastings-on-Hudson, County of Westchester, State of New York.

That he has read the patents suggested by the Examiner in charge of Gessler application Serial No. 622,453, as follows:

McElroy No. 1,489,356
McElroy No. 1,489,357
McElroy No. 1,450,692
McElroy No. 1,471,748
Doughty No. 1,439,695
Doughty No. 1,439,696.

C

Defendant's Exhibit E.

That deponent has carefully studied each of these patents and understands the art to which they relate [illegible] the processes and products disclosed therein. That deponent is also familiar with the said Gessler application for patent Serial No. 622,453 for Printing Ink and understands the process and product disclosed therein. That the Gessler invention is for a quick-drying ink adapted to print on paper in ordinary printing processes. It is suitable and, indeed, highly efficient for the printing of books, newspapers and magazines and may be used for the production of half-tones and similar pictorial work. The Doughty and McElroy inventions are wholly unsuited for any of these purposes. All six of the said patents relate to a so-called ink of the same general type, said ink being suitable for stamping leather, book-cloth, and similar materials, with a metal pigment and a binder. The binder is a gum, such as Cumar gum, neutral as to acidity, dissolved in terpineol and rosin oil.

In collaboration with Dr. Frederick P. Zinsser, who also makes an affidavit accompanying the present affidavit, deponent carried out detailed experiments to produce the product of the Doughty and McElroy patents. Deponent and Dr. Zinsser chose the McElroy patent No.1,489,357 as a typical example of the group of patents, and for the reason that this patent contains the most specific directions for the production of this special type of ink and because it was, as a consequence, the most suitable as a guide to the actual production of an ink exemplifying the work of these patentees.

Using the said McElroy patent No. 1,489,357, therefore, as a guide, deponent and Dr. Zinsser proceeded as follows: They weighed 159.6 grams of terpineol and to it they added 8.4 grams of rosin oil, stirring until thoroughly mixed. These proportions constituted 95% terpineol and 5% rosin oil as called for by the patent.

They then added 32 grams of powdered "Cumar" resin to this mixture, the "Cumar" thus constituting 16% of the whole mixture of

3 10

Defendant's Exhibit E.

150.6 + 96 + 38, or 16% of the [redacted] total, and warmed this mixture upon a water bath at 100° C., stirring meanwhile until the "Cumar" was thoroughly dissolved. After cooling the batch they took 150 grams of it and added to it 300 grams of bronze powder composed of 240 grams of No. 1 (80% of the powder mixture) and 60 grams of fine bronze powder known as "lining" (the 60 grams constituting 20% of the powder mixture). The total bronze powder content was thereafter equivalent to 300/450ths or two-thirds of the whole and the vehicle content was 150/450ths or one-third of the whole, as called for by McElroy.

They stirred this mixture until the bronze powder was thoroughly incorporated. The resulting gold color stamping ink is shown in the bottle marked Exhibit A which is submitted with this affidavit and made a part hereof.

The resulting ink is of a liquid, flowable consistency differing markedly in physical characteristics from the standard printing ink used for commercial printing. Submitted herewith and made a part hereof is a one-half pound can of Sinclair & Valentine's Standard Peacock Blue Ink, marked Exhibit B, which exemplifies the normal qualities of tack and viscosity -- the heavy consistency -- of a printing ink for commercial printing equipment. This heavy, tacky consistency is required for commercial printing to enable the ink properly to be spread upon the plates and distributed over the rollers of standard printing machinery and the composition of McElroy is entirely and definitely lacking in the properties of tack, viscosity and consistency to enable it to be so used. The differences in consistency between Exhibit B and Exhibit A are plainly observable to anyone.

95

Also submitted herewith and made a part hereof are samples of red and blue inks marked respectively Exhibits C and D, made in accordance with the aforementioned application of Dr. Gessler. These samples show a marked similarity in tack and viscosity with the standard ink

Defendant's Exhibit E.

exemplified in Exhibit B and have a similar heavy consistency. Exhibits C and D are, however, totally different from the McElroy ink of Exhibit A. The vehicle of Exhibit A strikes through the paper upon which a print has been made with it and leaves an oily outline which shows an absorption of the vehicle into the paper very much worse than that usually characterized by an ink which "halos". The McElroy ink is unstable and after a few hours the heavy metal pigment settled to the bottom.

The Cumar resin used was the most solid form of this type of resin obtainable in order to enable the patentee's instructions of preparing it in powdered form to be carried out. Nevertheless, the resin was so sticky at room temperatures that it had to be cooled in a refrigerator to cause it to harden sufficiently to comminute it, and even then it had to be used immediately to prevent its going back to the sticky state. This resin is similar in this respect to damar resin, Burgundy pitch, Canadian balsam, etc., referred to in the Doughty patents, and none of these gums possess the properties of solidity, coherence and lack of stickiness, that would enable them to be used in a printing ink compounded in accordance with the principles of Dr. Gessler's application. It is a fact that these resins will all fuse at the temperatures required in Dr. Gessler's process and would, therefore, not respond to a treatment designed to produce a hard flexible print merely by the evaporation of the solvent used.

Sworn to before me this)
12th day of December, 1934.) Alfred Benzon

P. F. Mealy

NOTARY PUBLIC

Defendant's Exhibit E.

RECEIVED
JAN 16 1935
PATENT OFFICE

64

CHARLES J. HOLLAND
ATTORNEY AND COUNSELLOR AT LAW
GRAYBAR BUILDING
EASTERN CONCOURSE · GRAND CENTRAL TERMINAL
NEW YORK CITY

TELEPHONE MOHAWK 4-5078-5079

January 14, 1935.

Hon. Commissioner of Patents,
Washington, D. C.

Forwarded Room

S i r : -

Re Gessler Serial No. 622,455 -- The attached exhibits are referred to in the affidavits of Dr. F. G. Zinsser and Dr. Alfred Berger which accompany the amendment in the above entitled case filed on even date herewith, and constitute a part thereof.

Respectfully,

Charles J. Holland

CJH:M

Attorney for Applicant.

Defendant's Exhibit E.

Bldg. 4708 Paper No. 13

Address only [redacted] SC/hc

DEPARTMENT OF COMMERCE
UNITED STATES PATENT OFFICE
WASHINGTON

Please find below a communication from the EXAMINER in charge of this application.

Commissioner of Patents.

Charles J. Holland,
420 Lexington Ave.,
New York, N. Y.

Applicant: Albert E. Gessler

Ser. No. 622,453
Filed July 14, 1932
For Printing ink and method of utilizing same

APR 10 1935

In response to amendment filed Jan. 16, 1935.

Claims 11 to 23 inclusive, 26, 27, 29, 30, 31 and 32 are again rejected for the reasons and references as stated in the last Office action.

In claims 11, 12, 13, 14, 16, 17, 18, 19, 21, 22, 26, 27, 29, 31 and 32, the amendment of "that are solid, coherent and non-sticky when solvent free" has been made thereto. The resins and nitrocellulose of the references are thought to also have these characteristics. This amendment was not in the application as filed but was added to page 4, line 5, of the specification and hence these qualities are thought to be obvious or else this amendment would apparently be based upon matter not originally disclosed.

Claim 20, line 4, the term "heavy consistency" added by amendment is not thought to render the claim patentable as the references obviously have a base material such as resin or nitrocellulose of such consistency so as to be suitable for ink. Moreover the term is comparative and not specific.

Claim 22, line 4, the amendment "quantity sufficient" relates to a functional or use difference and is not thought to be a patentable distinction and obviously the references use desired amounts of solvents so as to [redacted] suitable ink.

Claims 26, 27, 29 and 32 have been similarly amended but as stated this amendment is not thought to render the claims patentable.

Claim 32 has been rejected as unpatentable over Doughty

1,439,696 of record. Applicant argues that the resins used by Doughty would become sticky although Doughty on page 1, lines 49 to 51 states that his vehicle which contains the resin does not become gummy and has a suitable consistency for the printing process. In claim 32 no specific resin is claimed but on page 4, lines 4 and 5 of the specification applicant states that he uses either natural resin or synthetic resin, and Doughty also uses both natural resins and synthetic resins, page 1, lines 90 to 101. Accordingly claim 32 is not thought to be patentable over Doughty. Applicant has submitted affidavits by F. G. Zinsser and A. Burger and samples stated as made in accordance with McElroy patent 1,489,357, which is stated to have the same assignee as the Doughty patent.

Exhibits of other printing inks including applicant's are also submitted.

The affidavits state that the ink of Doughty is not suitable for the printing books and ordinary commercial printing.

However the ink of Doughty is a printing ink.

Claim 32 is drawn to a printing ink, a composition of matter, and not to a process of printing. There are many different kinds of printing processes.

Thus applicant is relying upon a functional or use difference over Doughty which is not thought to be a patentable difference sofar as the ink composition is concerned. Accordingly the affidavits and exhibits are not thought to render claim 32 patentable over Doughty.

Applicant has argued that Schneider uses a solvent which has practically no vapor pressure at all at room temperature. Applicant uses dibutyl phthalate disclosed by Schneider and diethylene glycol butyl ether or butyl carbitol. Schneider discloses diamyl phthalate which has a very low vapor pressure as stated in the last office action, and which is considered to be the equivalent of butyl carbitol used by applicant.

Defendant's Exhibit E.

In claim [illegible] claiming a solvent having very low vapor pressure. In claim 29, applicant is claiming a solvent which has no appreciable vapor pressure at room temperature. Schneider is accordingly thought to be a proper reference.

Incidentally butyl ether of diethylene glycol known commercially as butyl carbitol is stated as the last example on page 671 in the Davidson article of record.

Claims 33, 34, 35, 36, 39 and 41 which are similar to claim 32 are similarly rejected as unpatentable over either 1,954,450 of record, or Schneider or Doughty. It is to be noted that Doughty has quick drying when heated, page 2, lines 60 and 61.

Claims 37 and 38 which are similar to claim 18 are similarly rejected as unpatentable over either 1,954,450 or Schneider who have similar low vapor pressure solvents.

As an issue has clearly been reached, and no new references have been cited, the rejection of all the claims is made final. Ex Parte Miller 139 O. G. 730, Ex Parte Perry 140 O. G. 1001, Ex Parte Coddington 96 O. G. 1239, and Ex Parte Jackson 353 O. G. 5.

P. M. Nash
Examiner.

[illegible] 53 96.

Defendant's Exhibit E.

MAY 14 1935

Application of Albert E. [redacted],
For Improvements in Printing Ink and Method of
Utilizing Same,
Filed July 14, 1933,
Serial No. 622,453.

MAY 14 1935 U.S. PATENT OFFICE

The Commissioner of Patents,

Washington, D. C.

Sir:

The International Printing Ink Corporation, an Ohio corporation, having an office and place of business at 75 Varick Street, New York City, New York, assignee of the entire right in the above-entitled application, by virtue of an assignment executed April 2, 1935, and received by the Patent Office on May 6, 1935, hereby revokes all previous powers of attorney given herein, and hereby appoints Robert W. Byerly, of 225 Broadway, in the County of New York, and State of New York, whose registration number is 3194, its attorney, with full power of substitution and revocation, to prosecute said application, to make alterations and amendments therein, to receive the patent, and to transact all business in the Patent Office connected therewith.

Signed in New York City, New York, this 13th day of May, 1935.

THE INTERNATIONAL PRINTING INK CORPORATION

By [signature]

Vice-President

Accepted.

MAY 16 1935

622453

Defendant's Exhibit E.

EEC

DEPARTMENT OF COMMERCE
UNITED STATES PATENT OFFICE
WASHINGTON

May 16, 1935.

Robert W. Byerly,
225 Broadway,
New York, N. Y.

Applicant Albert E. Gessler

Serial No. 622,453

Filed July 14, 1932

For Printing Ink and Method of Utilizing Same

Div. 64

In this case your power of attorney has been accepted.

Respectfully,

Commissioner

, assignee

Revoking power of attorney

to

Charles J. Holland,
420 Lexington Ave.,
New York, N. Y.

Defendant's Exhibit E.

MAY 29 1935

Div. 44 Room 4708
ALBERT E. GESSLER
PRINTING INK & METHOD
OF UTILIZING SAME
Serial No. 682,486
Filed July 14, 1933.

New York, May 27 1935.

HON. COMMISSIONER OF PATENTS,
Washington, D. C.

S i r : -

Please recognize Charles J. Holland, Esq., of No. 420 Lexington Avenue in the Borough of Manhattan, City, County and State of New York, Register No. 11545, as my associate attorney in the above entitled application, with power to participate in the preparation and conduct of the prosecution of the case and to have access to the file.

Please continue to address all communications from the Patent Office to the principal attorney, the undersigned.

Respectfully,

Robert W. Wyeth
Principal Attorney.

AUTHORIZATION.

The International Printing Ink Corporation, assignee of the entire right, title and interest in the above entitled application, herewith authorizes the appointment of Charles J. Holland, Esq., as associate attorney.

THE INTERNATIONAL PRINTING INK CORPORATION.
By Oscar R. Cushman
President.

Defendant's Exhibit E.

4.17
Letter

Application of Albert E. Gessler,
For Improvements in Printing Ink and Method of
Utilizing Same,
Filed July 14, 1932,
Serial No. 622,453.

U. S. PATENT OFFICE
RECEIVED
JUL 9 1935
DIVISION 61

The Commissioner of Patents,
Washington, D. C.

Sir:

Please note that correspondence concerning this application should be addressed to me, as the associate power to Mr. Holland, filed May 29, 1935, expressly directed that the correspondence be conducted with the principal attorney.

I am calling attention to this matter because I am informed that a recent Office Action in application, Serial No. 15,944, in which a similar power of attorney was filed, has been mailed to Mr. Holland instead of to me.

Very respectfully,

Robert W. Byerly
Principal Attorney

New York City, July 6, 1935.

Defendant's Exhibit E.

U.S. PATENT OFFICE
SEP 26 1935

Application of Albert E. Gessler,
Printing Ink and Method of Utilizing Same,
Filed July 14, 1932,
Serial No. 622,485.

Div. 64

U. S. PATENT OFFICE
RECEIVED
SEP 29 1935
DIV. OF 64

The Commissioner of Patents,

Washington, D. C.

Sir:-

In response to the Office Action of April 10, 1935 and in view of the permission tentatively granted by the Principal Examiner at the interview held today, applicant submits an amendment to place this application in condition for allowance and requests that this amendment be entered provided that the Examiner is satisfied that all the claims presented in it are allowable.

Applicant hereby amends as follows:

Specification, page 3, line 4, before "vapor pressure" insert "low" -- lines 4 and 5, cancel "of the order of about one millimeter or less of mercury" -- line 8, after "raised" cancel matter inserted by amendment filed March 13, 1934 -- between lines 16 and 17, cancel paragraph inserted by amendment filed June 15, 1933 -- line 23, after "alone." cancel matter inserted by amendment filed June 15, 1933 -- lines 10, 27 and 31, change "butylether" to "monobutyl ether".

Specification, page 4, line 7, after "product" cancel matter inserted by amendment filed June 15, 1933.

Specification, page 4, lines 8 to 13, cancel "The diethylene glycol * * * at raised temperatures" -- after line 16, insert the following paragraph:

"The diethylene glycol monobutyl ether may be replaced by other solvents or solvent mixtures possessing a similar low

rate of evaporation at ordinary temperatures and a marked acceleration of volatility at raised temperatures. These important properties of diethylene glycol monobutyl ether, the preponderant solvent in the example given, may be indicated numerically in terms of its vapor pressure at different temperatures which are as follows:

At 20°C.	0.055	mm.
At 100°C.	8.0	mm.
At 150°C.	55.0	mm.

These vapor pressures indicate that, at elevated temperatures, this solvent becomes a highly volatile liquid like such highly volatile liquids as, for example, ethyl alcohol which has a vapor pressure of about 40 mm. at room temperature. The vapor pressures of my preponderant solvent at elevated temperatures contrast sharply with those of the high boiling solvents ordinarily termed "plasticizers" such as dibutyl phthalate, a minor proportion of which is used in the specific formula given. The vapor pressure of this liquid is 0.026 mm. at 100°C. and 0.7 mm. at 150°C. The vapor pressures of diethylene glycol monobutyl ether indicate that this solvent will evaporate almost instantaneously at elevated temperatures like ethyl alcohol at ordinary temperatures, while such high boiling solvents or plasticizers as dibutyl phthalate evaporate only slowly when heated to temperatures of 100°C. or 150°C."

Cancel the claims and insert the following claims:

42. A printing ink which is substantially non-drying at ordinary temperatures and dries rapidly at 150° C., consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component - being a member of the group consisting of natural and synthetic resins and cellulose esters - dissolved in the liquid component in sufficient quantity to give the proper consistency for typographic printing, in which the major part of the liquid component is an organic solvent for both cellulose esters and resins having a vapor pressure which at 20° C. is less than 0.06 mm. of mercury and at 150° C. approximates that of ethyl alcohol at ordinary temperatures.

43. A printing ink which is substantially non-drying at ordinary temperatures and dries rapidly at 150° C., consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component - being a member of the group consisting of natural and synthetic resins and cellulose esters - dissolved in the liquid component in sufficient quantity to give the proper consistency for typographic printing, in which substantially 73% of the liquid component is an organic solvent for both cellulose esters and resins having a vapor pressure which at 20° C. is less than 0.06 mm. of mercury and at 150° C. approximates that of ethyl alcohol at ordinary temperatures.

44. A printing ink which is substantially non-drying at ordinary temperatures and dries rapidly at 150° C., consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component - being a member of the group consisting of natural and synthetic resins

and cellulose esters - dissolved in the liquid component in sufficient quantity to give the proper consistency for typographic printing, in which substantially all the liquid component has a vapor pressure of less than 0.06 mm. of mercury at 20° C. and the major part of the liquid component has a vapor pressure which at 150° C. approximates that of ethyl alcohol at ordinary temperatures.

45. A printing ink which is substantially non-drying at ordinary temperatures and dries rapidly at 150° C., consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component - being a member of the group consisting of natural and synthetic resins and cellulose esters - dissolved in the liquid component in sufficient quantity to give the proper consistency for typographic printing, in which the major part of the liquid component is an ether including one butyl radical and one diethylene glycol radical and having a vapor pressure which at 20° C. is below 0.06 mm. of mercury and at 150° C. approximates that of ethyl alcohol.

46. A printing ink which is substantially non-drying at ordinary temperatures and dries rapidly at 150° C., consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component - being a member of the group consisting of natural and synthetic resins and cellulose esters - dissolved in the liquid component in sufficient quantity to give the proper consistency for typographic printing, in which the major part of the liquid component is monobutyl ether of diethylene glycol.

47. A printing ink which is substantially non-drying at ordinary temperatures and which dries rapidly at 150°C. consisting of a coloring matter dispersed in a viscous fluid vehicle consisting of a liquid component the major portion of which is an organic solvent for both nitrocellulose and resin having a vapor pressure which at 20°C. is below 0.06 mm. and at 150°C. approximates that of ethyl alcohol, and a solid component dissolved in the liquid component in an amount at least ~~three~~ 45% of the amount of said vehicle, said solid component being a member of the group consisting of natural and synthetic resins and low viscosity cellulose esters.

REMARKS.

The value of applicant's ink lies in the fact that it does not dry on the press and may be instantly dried by heat on the printed sheet.

The claims now presented make express reference to the result or function of applicant's ink, and are directed to the physical characteristic of applicant's ink which give the ink its valuable new function and distinguish it from the references.

To make the language of the claims clear, explanatory matter has been inserted on p. 4 of the specification, by amendment. This matter consists merely of specific data as to the vapor pressures of ingredients mentioned in the illustrative example. These are inherent characteristics of these ingredients which any properly equipped chemist can determine. The insertion, therefore, does not constitute new matter.

The specific example and data in regard to the ingredients obtainable by a skilled chemist are as follows:

		As % of total liquid	V.P. 20°C.	V.P. 100°C.	V.P. 150°C.
Vehicle					
Diethylene glycol monobutyl ether	55	73)	0.055	8.0	55.
Dibutyl phthalate	10	13)	.001	0.027	0.7
Blown Castor Oil	10	13).	non-volatile		
Total liquid component	75	100			
Solid component (low viscosity nitrocellulose)	35	47			
Pigment	100				

The following physical characteristics of applicant's ink appear from this data:

First. The ink contains a solvent for both nitrocellulose and resins which has a vapor pressure of 0.055 mm. at 20°C., so that its evaporation at room temperature is negligible, and a vapor pressure of 55 mm. at 150°C., so that at this temperature it has the characteristics of a highly volatile liquid such, for example, as ethyl alcohol, whose vapor pressure at ordinary temperature is about 40 mm. To accomplish the results obtained by applicant's ink, no solvent can be equivalent to this solvent, if it has a vapor pressure substantially higher than 0.055 mm. at 20°C., for in this case the ink would dry on the press, or if it has a comparatively low vapor pressure at 150°C., as in this case it could not be vaporized instantly by any heat which can safely be applied to printing matter.

The vapor pressure characteristics of the solvent exemplified by diethylene glycol monobutyl ether (butyl carbitol) in the specific example are defined in the claims now presented by the limitation that the vapor pressure at 20°C. is below 0.06 mm. and at 150°C. approximates that of ethyl alcohol at ordinary temperatures (Claims 44, 45).

Second. The solvent having these vapor pressure characteristics is the major part of the liquid in the vehicle of applicant's ink, amounting to well over 50% of the entire liquid content of the ink. To accomplish applicant's purpose, it is evidently not necessary that the solvent having these characteristics be the only solvent in the ink vehicle, as applicant uses minor percentages of plasticizers, at least one of which, dibutyl phthalate, may be referred to as a solvent. This solvent plasticizer, however, has a vapor pressure of only 0.7 mm. at 150°C., and therefore does not evaporate rapidly when the printed matter is heated. As pointed out in the specification, it remains in the dried ink. But while other solvents not having the vapor pressure characteristics of butyl carbitol may be present in the ink vehicle, it is apparent that to obtain the two results of not drying on the press and drying instantly on heating the printed matter, the solvent having these vapor pressure characteristics must be the major part of the liquid component.

This characteristic of applicant's ink is defined in all the claims now presented by the limitation that the solvent having the specified vapor pressure characteristics constitutes the major part of the liquid component of the ink.

The claims now submitted specify a printing ink consisting of a pigment dispersed in a vehicle which consists of two components, a liquid component and a solid component (nitrocellulose or resin) dissolved in the liquid component. The claims also specify that there must be at least enough of the solid component to give the ink enough consistency for typographic printing. This defines the known type of ink in which applicant's invention has effected an important improvement. This

improvement which gives the ink the valuable characteristics specified in the preamble of each claim is defined in detail in the last clause of each claim. Claim 47 is drawn to specify the solid content characteristic as disclosed by the specific example given in the specification.

In the arguments accompanying the previous amendments, it has been pointed out that none of the references relied on by the Examiner defines the important functional advantages of applicant's ink. The present statement will be limited to pointing out that the physical characteristics of applicant's ink, defined in the claims now presented, distinguish it from the references relied on.

Schneider Patent No. 1,966,907, covering a special ink for imitation engraving which dries very slowly, if at all, contains only solvents of the plasticizer class, all of which have vapor pressures of not more than one mm. at 150°C.

Middleton Patent No. 1,833,086, for a special ink for printing on films, and Fleischman Patent No. 1,787,239, for an ink for intaglio printing, are both unusable in ordinary typographic printing since they contain only highly volatile solvents, the least volatile of which has a vapor pressure above 2 mm. at 20°C.

British Patent No. 335,074, for a lithographic ink, uses for solvents, phthalates, triphenyl phosphate, diethylene glycol mono-salicylate, and tri-acetin, all of which have vapor pressures of not more than 8 mm. at 150°C. and also two volatile solvents, ethyl benzoate and benzyl acetate, both of which have vapor pressures above 0.1 mm. or about twice that of applicant's preferred solvent at 20°C.

Lawrence Patent No. 1,954,450, for a solid transfer ink, mentions applicant's solvent, butyl carbitol and a number of others, one of which, diethylene glycol and possibly others,

have vapor pressure characteristics similar to those of butyl carbitol. But Lawrence does not suggest the use of butyl carbitol or any of these other solvents as the major part of the liquid component of an ink. In his Example No. 2 where butyl carbitol is mentioned, it amounts to only 14% of the liquid component of the ink vehicle. His ink vehicle is clearly a solid, not a viscous fluid.

Reese Patent No. 1,984,961 relates to lacquers rather than printing inks. It mentions butyl carbitol and possibly one or two other solvents having similar vapor pressure characteristics, but in no one of its numerous examples does butyl carbitol or any similar solvent exceed 18% of the liquid component of the composition.

Doughty Patent No. 1,439,696 is for a stamping ink. The patentee contemplated drying his ink by heat, but the method of drying which he proposed is, however, necessarily inoperative in ordinary printing because it contemplated applying no more heat to the ink on the printed matter than to the ink on the type or stamp, as the heat was applied by the stamp. The method, therefore, results in drying the ink on the type in the press, which is precisely what applicant avoids.

Inks of the formulae given in this patent are inoperative when applied by an ordinary typographic press and then heated on the printed matter. They dry on the press and are smudgy after being dried on the paper. The two solvents preferred by Doughty are terpineol and benzyl alcohol which have vapor pressures over 0.1 mm. at 20°C; that is to say, about twice as great as the vapor pressure as applicant's preferred solvent at this temperature. This difference makes them dry too rapidly on the press. Furthermore the Doughty inks are not of the class speci-

fied in the claims as they do not contain sufficient dissolved solid to give sufficient consistency for typographic printing.

All the claims now presented distinguish from Doughty (as well as the other references) by the specific limitations as to vapor pressure characteristics of the major part of the liquid component.

The broadest of the claims now presented No. 42 is substantially in the form worked out at the recent interview as properly defining the true scope of applicant's invention. The other claims define the invention more narrowly. It is requested that this amendment be entered and the application be passed to allowance in order that an appeal may be unnecessary.

It is understood that the above amendment will not be entered unless the Examiner is satisfied that it places the application in condition for allowance. If the Examiner is not so satisfied it is requested that the above claims 42 to 47 be added to the claims now on file and that the above amendments to the specification be entered to clarify the case for the purpose of appeal.

Respectfully submitted,

Albert E. [illegible]

and by R. W. Byerly [illegible]
His Attorney.

Defendant's Exhibit E.

Div. 64 Room 4708 Paper No. 19

Address only "The Commissioner of Patents, Washington, D. C." and not any official by name SC/ho

DEPARTMENT OF COMMERCE
UNITED STATES PATENT OFFICE
WASHINGTON

Please find below a communication from the EXAMINER in charge of this application.

Commissioner of Patents.

Robert W. Byerly,
225 Broadway,
New York, N. Y.

Applicant: Albert E. Gessler

Ser. No. 622,453
Filed July 14, 1932
For Printing ink and method of utilizing same

MAILED
OCT 3 - 1935

In response to letter and amendment filed July 8 and Sept. 26, 1935.

Additional reference cited:

Clewell 1,806,965 May 26, 1931 134-38

The proposed amendment received Sept. 26, 1935 has not been entered as it does not place the case in condition for allowance.

In the proposed claims ".06 mm." is not found in the description and hence is not a critical vapour pressure. Apparently it should be changed to ".055" which has a basis therefor. Proposed claim 42, line 8, "major part" apparently should be so stated positively in the description.

Proposed claim 47, line 9, "at least 45%" is not found in the description as a critical percentage which should be done although the actual percentage in view of the specific example appears to be nearer 47% than 45%.

Proposed claims 42, 43, 44 and 47 would be rejected as unpatentable over Clewell in case this proposed amendment would be entered. Clewell claims the use of diethylene glycol which is used in major proportion together with shellac, a resin. Applicant has stated on pages 8 and 9 of the proposed amendment that diethylene glycol has vapor pressure characteristics similar to that of butyl carbitol.

Defendant's Exhibit E.

622,453

In proposed claims 45 and 46, "typographic" is apparently new matter not found in the original specification and should be erased or some term found in the original specification substituted therefor.

If this is done, proposed claims 45 and 46 would be allowable as now advised. The proposed amendment will be entered for purposes of appeal if desired. However, a supplemental amendment should be filed including the above suggested corrections. Applicant discloses only butyl carbitol, and note in re Gibbons et al 1934 C. D. 382. The case should be placed in condition for allowance or else an appeal filed within six months from the date of the final rejection.

Apr. 10, 1935.

J M Nash

Examiner.

Defendant's Exhibit E.

20
Gl

Application of Albert E. Gessler,
Printing Ink and Method of
Utilizing Same,
Filed July 14, 1933,
Serial No. 680,453.

Div. 64
Room 4708

The Commissioner of Patents,

Washington, D. C.

Sir:-

In response to the Office Letter of October 3, 1935 refusing to enter the amendment filed September 26, 1935, and citing an additional reference, applicant hereby cancels said amendment filed September 26, 1935 and submits a revised amendment to place this application in better condition for appeal, and requests that this amendment be entered for that purpose.

Applicant hereby amends as follows:

Specification, page 1, line 9, after "Such oils or varnishes" insert "have viscosities of 5 poises or above (Bingham Fluidity and Plasticity Edition 1922, page 5) and"

Specification, page 3, line 4, before "vapor pressure" insert "low" -- lines 4 and 5, cancel "of the order of about one millimeter or less of mercury" -- line 8, after "raised" cancel matter inserted by amendment filed March 13, 1934 -- between lines 16 and 17, cancel paragraph inserted by amendment filed June 15, 1933 -- line 23, after "alone." cancel matter inserted by amendment filed June 15, 1933 -- lines 10, 27 and 31, change "butylether" to "monobutyl ether".

Specification, page 4, line 7, after "product" cancel matter inserted by amendment filed June 15, 1933.

Specification, page 4, lines 8 to 13, cancel "The diethylene glycol * * * at raised temperatures" -- after line 16, insert the following paragraph:

"The diethylene glycol monobutyl ether may be replaced by other solvents or solvent mixtures possessing a similar low rate of evaporation at ordinary temperatures and a marked acceleration of volatility at raised temperatures.

These important properties of diethylene glycol monobutyl ether, the preponderant solvent constituting the major part of the liquid component of the ink in the example given, may be indicated numerically in terms of its vapor pressure at different temperatures which are as follows:

At 80°C.	Between 0.05 and 0.06 mm.
At 100°C.	8.0 mm.
At 150°C.	55.0 mm.

These vapor pressures indicate that, at elevated temperatures, this solvent becomes a highly volatile liquid like such highly volatile liquids as, for example, ethyl alcohol which has a vapor pressure of about 40 mm. at ordinary room temperature. The vapor pressures of my preponderant solvent at elevated temperatures contrast sharply with those of the high boiling solvents ordinarily termed "plasticizers" such as dibutyl phthalate, a minor proportion of which is used in the specific formula given. The vapor pressure of this liquid is 0.03 mm. at 100°C. and 0.7 mm. at 150°C. The vapor pressures of diethylene glycol monobutyl ether indicate that this solvent will evaporate almost instantaneously at elevated temperatures like ethyl alcohol at ordinary temperatures, while such high boiling solvents or plasticizers as dibutyl phthalate evaporate only slowly when heated to temperatures of 100°C. or 150°C."

Add the following claims:

"~~4.~~ A printing ink which is substantially non-drying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink - the solid component being a

member of the group consisting of natural and synthetic resins and cellulose compounds, and the major part of the liquid component being a chemical compound containing carbon, hydrogen and oxygen which dissolves and forms a stable solution with the solid component and which has a vapor pressure which at 20°C., is ~~less than 0.01 mm. of mercury~~ as low as the vapor pressure of diethylene glycol monobutyl ether at 20°C., and, at 150°C., approximates that of ethyl alcohol at ordinary temperatures.

2. A printing ink which is substantially non-drying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink, the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, and substantially 75% of the liquid component being a chemical compound containing carbon, hydrogen and oxygen, which dissolves and forms a stable solution with the solid component and which has a vapor pressure which, at 20°C., is ~~less than 0.01 mm. of mercury~~ as low as the vapor pressure of diethylene glycol monobutyl ether at 20°C., and, at 150°C., approximates that of ethyl alcohol at ordinary temperatures.

3. A printing ink which is substantially non-drying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component completely dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink, the solid component being a member of the group consisting of natural and synthetic

resins and cellulose compounds, substantially all of the liquid component having a vapor pressure ~~of less than 0.06 mm. of mercury~~ as low as that of diethylene glycol monobutyl ether at 20°C., at 20°C., and the major part of the liquid component having a vapor pressure which at 150°C. approximates that of ethyl alcohol at ordinary temperatures, and forming a stable solution with the ~~liquid~~ solid component.

~~43.~~ A printing ink which is substantially non-drying at ordinary temperatures and dries rapidly at 150°C., consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component - being a member of the group consisting of natural and synthetic resins and cellulose compounds - dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink, in which the major part of the liquid component is an ether including one butyl radical and one diethylene glycol radical and having a vapor pressure which at 20°C. is ~~below 0.06 mm. of mercury~~ as low as the vapor pressure of diethylene glycol monobutyl ether at 20°C., and at 150°C. approximates that of ethyl alcohol.

~~44.~~ A printing ink which is substantially non-drying at ordinary temperatures and dries rapidly at 150°C., consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component - being a member of the group consisting of natural and synthetic resins and cellulose compounds - dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink, in which the major part of the liquid component is monobutyl ether of diethylene glycol.

~~45.~~ A printing ink which is substantially non-drying at ordinary temperatures and which dries rapidly at

Defendant's Exhibit E.

150° C. consisting of a coloring matter dispersed in a viscous fluid vehicle consisting of a liquid component the major portion of which is an organic solvent forming stable solutions with both nitrocellulose and resin having a vapor pressure which at 20°C. is ~~below 0.06 mm.~~ as low as the vapor pressure of diethylene glycol monobutyl ether at 20°C. and at 150°C. approximates that of ethyl alcohol, and a solid component completely dissolved in the liquid component in an amount at least 47% of the amount of said liquid component, said solid component being a member of the group consisting of natural and synthetic resins and low viscosity cellulose esters.

~~16~~ A printing ink which is substantially non-drying at ordinary temperatures and which dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component dissolved in a liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink - the solid component being a cellulose compound, and the major part of the liquid component being a chemical compound which dissolves and forms a stable solution with the solid component and which has a vapor pressure which at 20°C. is as low as the vapor pressure of diethylene glycol monobutyl ether at 20°C. ~~less than 0.06 mm. of mercury~~ and at 150°C. approximates that of ethyl alcohol at ordinary temperatures.

REMARKS

The value of applicant's ink lies in the fact that it does not dry on the press and may be instantly dried by heat on the printed sheet.

The claims now presented make express reference to the result or function of applicant's ink, and are directed to the physical characteristics of applicant's ink which give the

Defendant's Exhibit E.

ink its valuable new function and distinguish it from the references. To make the language of the claims clear, explanatory matter has been inserted on p. 4 of the specification, by amendment. This matter consists merely of specific data as to the vapor pressures of ingredients mentioned in the illustrative example. These are inherent characteristics of these ingredients which any properly equipped chemist can determine. The insertion, therefore, does not constitute new matter.

The specific example and data in regard to the ingredients obtainable by a skilled chemist are as follows:

		As % of total liquid	V.P. 20°C.	V.P. 100°C.	V.P. 150°C.
Vehicle					
Diethylene glycol monobutyl ether	55	73)	0.05-0.06	8.0	55.
Dibutyl phthalate	10	13)	.001	0.03	0.7
Blown Castor Oil	10	13)	non-volatile		
Total liquid component	75	100			
Solid component (low viscosity nitrocellulose)	35	47			
Pigment	100				

The following physical characteristics of applicant's ink appear from this data:

First: The ink contains an organic solvent (a chemical compound containing carbon, hydrogen, and oxygen) which has a vapor pressure of between 0.05 and 0.06 mm. at 20°C., so that its evaporation at room temperature is negligible, and a vapor pressure of 55 mm. at 150°C., so that at this temperature it has the characteristics of a highly volatile liquid such, for example, as ethyl alcohol, whose vapor pressure at ordinary temperature is about 40 mm. To accomplish the results obtained by applicant's ink, no solvent can be equivalent to this solvent, if it has a vapor pressure substantially higher

than 0.06 mm. at 20°C., for in this case the ink would dry on the press, or if it has a comparatively low vapor pressure at 150°C., as in this case it could not be vaporized instantly by any heat which can safely be applied to printing matter.

The vapor pressure characteristics of the solvent exemplified by diethylene glycol monobutyl ether (butyl carbitol) in the specific example are defined in the claims now presented by the limitation that the vapor pressure at 20°C. is below 0.06 mm. and at 150°C. approximates that of ethyl alcohol at ordinary temperatures.

Second. The organic solvent dissolves and forms a stable solution with the solid component of the ink vehicle. This is important because it avoids any depositing of the solid component while the ink is on the press and thus enables the dissolved solid component to act effectively as a thickener to give and maintain the proper consistency and also to act as a binder for the pigment after the solvent has evaporated.

This important characteristic of the solvent exemplified by butyl carbitol in the specific example is defined in the claims now presented by specifying a chemical compound which forms a stable solution with the solid component of the vehicle.

Third. The solvent having these characteristics is the major part of the liquid in the vehicle of applicant's ink, amounting to well over 50% of the entire liquid content of the ink. To accomplish applicant's purpose, it is evidently not necessary that the solvent having these characteristics be the only solvent in the ink vehicle, as applicant uses minor

Defendant's Exhibit E.

percentages of plasticizers, at least one of which, dibutyl phthalate, may be referred to as a solvent. This solvent plasticizer, however, has a vapor pressure of only 0.7 mm. at 150°C., and therefore does not evaporate rapidly when the printed matter is heated. As pointed out in the specification, it remains in the dried ink. But while other solvents not having the vapor pressure characteristics of butyl carbitol may be present in the ink vehicle, it is apparent that, to obtain the two results of not drying on the press and drying instantly on heating theprinted matter, the solvent having these vapor pressure characteristics must be the major part of the liquid component.

This characteristic of applicant's ink is defined in all the claims now presented by the limitation that the solvent having the specified characteristics constitutes the major part of the liquid component of the ink.

The claims now submitted specify a printing ink consisting of a coloring matter dispersed in a vehicle which consists of two components, a liquid component and a solid component (nitrocellulose or resin) dissolved in the liquid component. The claims also specify that there must be at least enough of the solid component to give the ink the consistency of an ordinary oil-varnish ink. This defines the known type of ink in which applicant's invention has effected an important improvement. This improvement which gives the ink the valuable characteristics specified in the preamble of each claim is defined in detail in the last clause of each claim. Claim 47 is drawn to specify the solid content proportion as disclosed by the specific example given in the specification. Claim 48 limits the solid component to cellulose esters.

Defendant's Exhibit E.

In the arguments accompanying the previous amendments, it has been pointed out that none of the references relied on by the Examiner defines the important functional advantages of applicant's ink. The present statement will be limited to pointing out that the physical characteristics of applicant's ink, defined in the claims now presented, distinguish it from the references relied on.

Schneider Patent No. 1,966,907, covering a special ink for imitation engraving which dries very slowly, if at all, contains only solvents of the plasticizer class, all of which have vapor pressures of not more than one mm. at 150°C.

Middleton Patent No. 1,833,086, for a special ink for printing on films, and Fleischman Patent No. 1,787,239, for an ink for intaglio printing, are both unusable in ordinary typographic printing since they contain only highly volatile solvents, the least volatile of which has a vapor pressure above 2 mm. at 20°C.

British Patent No. 335,074, for a lithographic ink, uses for solvents, phthalates, triphenyl phosphate, diethylene glycol mono-salicylate, and tri-acetin, all of which have vapor pressures of not more than 8 mm. at 150°C. and also two volatile solvents, ethyl benzoate and benzyl acetate, both of which have vapor pressures above 0.1 mm. or about twice that of applicant's preferred solvent at 20°C.

Lawrence Patent No. 1,954,450, for a solid transfer ink, mentions applicant's solvent, butyl carbitol, and a number of others, one of which, diethylene glycol and possibly others, have vapor pressure characteristics similar to those of butyl carbitol. But Lawrence does not suggest the use of butyl carbitol or any of these other solvents as the major

part of the liquid component of an ink. In his Example No. 2 where butyl carbitol is mentioned, it amounts to only 14% of the liquid component of the ink vehicle. His ink vehicle is clearly a solid, not a viscous fluid.

Reese Patent No. 1,924,961 relates to lacquers rather than printing inks. It mentions butyl carbitol and possibly one or two other solvents having similar vapor pressure characteristics, but in no one of its numerous examples does butyl carbitol or any similar solvent exceed 18% of the liquid component of the composition.

Doughty Patent No. 1,439,896 is for a stamping ink. The patentee contemplated drying his ink by heat, but the method of drying which he proposed is, however, necessarily inoperative in ordinary printing because it contemplated applying no more heat to the ink on the printed matter than to the ink on the type or stamp, as the heat was applied by the stamp. The method, therefore, results in drying the ink on the type in the press, which is precisely what applicant avoids.

Inks of the formulae given in this patent are inoperative when applied by an ordinary typographic press and then heated on the printed matter. They dry on the press and are smudgy after being dried on the paper. The two solvents preferred by Doughty are terpineol and benzyl alcohol which have vapor pressures over 0.1 mm. at 20°C; that is to say, about twice as great as the vapor pressure as applicant's preferred solvent at this temperature. This difference makes them dry too rapidly on the press. Furthermore, the Doughty inks are not of the class specified in the claims as they do not contain sufficient dissolved solid to give the consistency of an ordinary oil-varnish ink such as is used for typographic printing.

Defendant's Exhibit E.

All the claims now presented distinguish from Doughty (as well as the other references) by the specific limitations as to vapor pressure characteristics of the major part of the liquid component.

Clewell Patent No. 1,806,965 describes a special ink for printing on cellulose ester plastics such as moving-picture films. The ink contains a solvent for the material printed upon so that the ink "will be at least partially absorbed into the ester body" on which it is printed (lines 23, 24). The ink was not intended for rapid printing on ordinary paper and the patent contains no suggestion of using heating for instant drying of the ink. The wide boiling point range given in the patent includes many solvents whose vapor pressures would preclude their use for this purpose. The patent, therefore, in no way suggests applicant's invention.

No one of the three examples given in the patent discloses an ink capable of the functions of applicant's ink or meets the claims now presented:

The first two solvents suggested, diacetone alcohol and ethyl lactate have vapor pressures of 8.5 mm. and 8.3 mm. respectively at 20°C. and are thus far outside the vapor pressure range specified in the claims.

Clewell's third example, covered by his Claim 4, to which the Examiner especially refers, is an ink having a vehicle whose solid component is shellac and whose liquid component is diethylene glycol. This ink vehicle is a suspension - not a solution - as shellac (the thickener used by Clewell) is <u>insoluble</u> in diethylene glycol (Durrans, Solvents/ 3rd. Ed. 1933 D. Van Nostrand Co. p..136; Industrial and Engineering Chemistry, July 1926,

Vol. 18, No. 6, p. 671). Furthermore, diethylene glycol cannot form a stable solution, even with thickeners that are soluble in it, since it is so very hygroscopic (Durrans; Solvents/3rd. Ed./pp. 130, 136) that it absorbs water and soon throws out any thickener which has been dissolved in it.

All the claims now presented clearly distinguish from Clewell's first two examples by the vapor pressure range specified, and from Clewell's third example by requiring a solvent which dissolves and forms a stable solution with the solid component of the vehicle.

The informalities in the claims presented by the amendment filed September 26, 1935 have been corrected:

The proposed amendment to the specification has been changed to describe the vapor pressure of butyl carbitol at 20° C. as "between 0.05 and 0.06 mm.". This expression has been adopted because it is impossible to measure the vapor pressure accurately to the third decimal place. With this statement in the specification, it is believed there can be no objection to the use of "less than 0.06 mm." in the claims.

In proposed Claim 47 "45%" has been changed to "47%" as suggested by the Examiner.

The word "typographic", which the Examiner has considered new material (a view in which applicant does not acquiesce) has been eliminated and the consistency has been referred to in connection with ordinary "oil-varnish" printing inks which are referred to at the beginning of the specification. That applicant's ink has the consistency of such an ordinary printing ink is apparent from the statement at page 4, lines 17 and 18 of the specification.

Defendant's Exhibit E.

At the interview granted today the Principal Examiner indicated that claims 42 to 48 presented herewith are allowable and indicated that the specification should be amended to make definite the reference in the claims to the consistency of an ordinary oil-varnish ink. Such an amendment has been made on line 9 of page 1.

Since the Examiner has indicated that the claims now presented are allowable so that there will be no necessity for an appeal, applicant hereby authorizes the Examiner to cancel claims 11 to 41 inclusive on the allowance of claims 42 to 48 so that the application may be passed to allowance at an early date.

Respectfully submitted,

ALBERT E. GESSLER,

By Robert H. Byerly
His Attorney

Defendant's Exhibit E.

Div. 64 Room 4708 DEPARTMENT OF COMMERCE Paper No. 21

Address only "The Commissioner of Patents, Washington, D. C." and not any official by name SC/hc

UNITED STATES PATENT OFFICE
WASHINGTON

Please find below a communication from the EXAMINER in charge of this application

Commissioner of Patents.

Robert W. Byerly,
225 Broadway,
New York, N. Y.

Applicant Albert E. Gessler

Ser. No. 622,453
Filed July 14, 1932
For Printing ink and method of utilizing same.

OCT 16

In accordance with the provisions of Order No. 2308, dated March 12, 1917, which reads in part as follows:

* * * * * * * *

Obvious informalities in the application may be corrected by the examiner, but said correction must be in the form of an amendment, approved by the Principal Examiner in writing, placed in the file, and made a part of the record. The changes specified in the amendment will be entered by the clerk in the regular way.

* * * * * * * *

the changes, hereinafter specified, are made by the examiner in the application above identified.

Should these changes not be satisfactory to the applicant, appropriate amendment may be proposed under the provisions of Rule 78, provided the specification has not been printed.

The application has been amended as follows:

Preamble, line 4, "And Method of Utilizing Same" has been erased as the claims are drawn to a printing ink.

Page 1, line 9, "Edition 1922" has been changed to "1922 Edition".

Page 1, line 9, commas have been inserted after "Bingham" and "Edition".

Page 3, line 22, "plasticiser" has been changed to "plasticizer".

Page 3, line 28, "and" has been inserted before "10 parts".

Page 3, line 17, "butyl ether" has been changed to "monobutyl ether" as was obviously intended.

Page 4, line 8, Amendment G^1, line 16, "ordinary" has been inserted before "room".

P. M. Nash
Examiner.

126

Defendant's Exhibit E.

ADDRESS ONLY THE COMMISSIONER OF PATENTS WASHINGTON, D.C.

Div. 64

Serial No. 622,453

DEPARTMENT OF COMMERCE
UNITED STATES PATENT OFFICE
WASHINGTON

October 10th 1935

MAILED OCT 10 1935

Albert E. Gessler, Assor.,

Your APPLICATION for a patent for an IMPROVEMENT in Printing Ink

filed July 14, 1932 has been examined and ALLOWED with 11 claims.

The final fee, THIRTY DOLLARS, WITH $1 ADDITIONAL FOR EACH CLAIM ALLOWED IN EXCESS OF 20, must be paid not later than SIX MONTHS from the date of this present notice of allowance. If the final fee be not paid within that period, the patent will be withheld, but the application may be renewed within one year after the date of the original notice with a renewal fee of $30 and $1 additional for each claim in excess of 20.

The office delivers patents upon the day of their date, on which date their term begins to run. The preparation of the patent for final signing and sealing will require about four weeks, and such work will not be begun until after payment of the necessary final fee.

When the final fee is paid, there should also be sent, DISTINCTLY AND PLAINLY WRITTEN, the name of the INVENTOR, TITLE OF THE INVENTION, AND SERIAL NUMBER AS ABOVE GIVEN, DATE OF ALLOWANCE (which is the date of this circular), DATE OF FILING, and, if assigned, the NAMES OF THE ASSIGNEES.

If it is desired to have the patent issue to an ASSIGNEE OR ASSIGNEES, an assignment containing a REQUEST to that effect, together with the FEE for recording the same, must be filed in this office on or before the date of payment of the final fee.

After issue of the patent, uncertified copies of the drawings and specifications may be purchased at the price of TEN CENTS EACH. The money should accompany the order. Postage stamps will not be received.

The final fee will NOT be received from other than the applicant, his assignee or attorney, or a party in interest as shown by the records of the Patent Office.

NOTICE.—WHEN THE NUMBER OF CLAIMS ALLOWED IS IN EXCESS OF 20, NO SUM LESS THAN $30 PLUS $1 ADDITIONAL FOR EACH CLAIM IN EXCESS OF TWENTY CAN BE ACCEPTED AS THE FINAL FEE.

Respectfully,

Commissioner of Patents.

Robert W. Byerly,
225 Broadway,
New York, N. Y.

62245

IN REMITTING THE FINAL FEE GIVE THE SERIAL NUMBER AT THE HEAD OF THIS NOTICE.

UNCERTIFIED CHECKS WILL NOT BE ACCEPTED.

Defendant's Exhibit E.

U. S. PATENT OFFICE

Paper 22

DIVISION

Application of Albert E. Gessler,
Printing Ink and Method of Utilizing Same,
Filed July 14, 1932,
Serial No. 622,453.

Div. 64
Room 4708

The Commissioner of Patents,

Washington, D. C.

Sir:-

Will you please permit JOHN MILTON JESTER, of 908 G Street, N. W., Washington, D. C., to inspect the file of this application.

Very respectfully,

Robert W. Byers

Attorney for Applicant.

E

522 - 1

Defendant's Exhibit E.

RULE 78
MAR 17 1936
ORDERS No. 2000, 2801, 3311

U. S. PATENT OFFICE
MAR 17 1936
DIVISION

Application of Albert E. Gessler,
Printing Ink,
Filed July 14, 1933,
Serial No. 622,453.

Div. 64
Room 4702

U. S. PATENT OFFICE
RECEIVED
MAR 1936
DIVISION 64

The Commissioner of Patents,
Washington, D. C.

Sir:

It is requested that the following amendment be admitted under the provisions of Rule 78:

Specification, page 1, lines 1 and 2, after "printing inks" cancel "and methods of utilizing the same"--line 2, after "preparation" cancel "and utilization" --line 5, before "procedure" cancel "methods and" --between lines 7 and 8, cancel the paragraph beginning "In referring" and ending "commercial printing" inserted by amendment filed January 16, 1935 --line 8, after "printing inks" cancel "of the type so identified" inserted by amendment filed January 16, 1935 --line 9, after "or varnishes" cancel "have viscosities of 5 poises or above (Bingham, Fluidity and Plasticity 1922 Edition, page 8) and" inserted by amendment filed October 8, 1935 and by Examiner's amendment filed October 10, 1935, and substitute "have absolute viscosities of 5 poises or above at 25°C., measured by the method applied to varnish viscosities (Gardner's Physical and Chemical Examination of Paints, Varnishes, etc., Fifth Edition 1930, pp. 246, 152, 153) and" --line 30, after "volatility" cancel "and the dissolved substances are present therein in relatively low concentration" inserted by amendment filed March 13, 1934 --same line, after "Indeed" cancel "these characteristics are" inserted by amendment filed March 13, 1934, and reinstate "this characteristic is" --same line,

622453

Defendant's Exhibit E.

after "considered" cancel "of" inserted by amendment filed March 13, 1934, and reinstate "an"

Specification, page 2, line 1, before "rapid drying" cancel "free-flowing and" inserted by amendment filed March 13, 1934, and reinstate "a" --same line, after "hardening" cancel "are" inserted by amendment filed March 13, 1934, and reinstate "is" --line 2, before "rapid drying" cancel "low concentration of solids and" inserted by amendment filed March 13, 1934 --same line, before "inks" cancel "render" inserted by amendment filed March 13, 1934, and reinstate "renders" --line 9, before "cellulose compounds" cancel "low viscosity" inserted by amendment filed March 13, 1934 --lines 19 to 21, after "days" cancel "But I have also found" inserted by amendment filed June 15, 1933, and reinstate "This defect, however, may be remedied by the present invention, which involves a recognition of the principle" --lines 23 to 25, cancel sentence beginning "Consequently the print" and ending "these solvents" inserted by amendment filed June 15, 1933, and reinstate ", while at the same temperatures others show little change in their vapor pressures and therefore are practically non-volatile" --line 27, before "vapor" reinstate "high" cancelled by amendment filed June 15, 1933 --line 28, after "pressures" cancel matter beginning "which increase" and ending "room temperatures" inserted by amendments filed June 15, 1933 and March 13, 1934, and reinstate "at elevated temperatures" --lines 29 and 30, cancel matter beginning "differ from" and ending "ink, and" inserted by amendment filed March 13, 1934, and reinstate "in contradistinction to lacquer solutions which require highly volatile solvents"

Defendant's Exhibit E.

B 2264

Specification, page 3, line 8, reinstate "or solvent mixtures" cancelled by amendment filed June 15, 1933-- line 17, after "may be" cancel "seem to be best obtained by the use of a main solvent, such as diethylene glycol monobutyl ether" inserted by amendment filed June 15, 1933 and by the Examiner's amendment filed October 10, 1935, and reinstate "further"

Specification, page 4, line 5, after "resins" cancel "that are solid, coherent and non-sticky when solvent free" inserted by amendment filed January 16, 1936 -- lines 13 to 16, reinstate "It may be desirable in some circumstances to omit the last two types of ingredients referred to in the illustrative formula, namely, those which have been added in order to offset extreme hardness and brittleness." cancelled by amendment filed June 15, 1933 -- after line 16, and before the paragraph inserted by amendment filed October 8, 1935, insert the following paragraph:

"Diethylene glycol monobutyl ether is a practically odorless, saturated, aliphatic or open-chain chemical compound of carbon, hydrogen and oxygen."

Page 4, line 24, after "use." add "This method of printing is not claimed herein as it forms the subject matter of my co-pending application, Serial No. 15,944, filed April 12, 1935, which is in part a continuation of this application."

Specification, page 5, line 5, after "print" cancel matter beginning "The ink is" and ending "through the paper to which it is applied" inserted by amendment filed January 16, 1936 --line 8, after "grease" cancel "heat" inserted by amendment filed January 16, 1936 --same line, after "odor" cancel "Successive sheets of printed material will not offset or stick together but the" inserted by amendment filed January 16, 1936, and reinstate "The" --line 9, after "surface" cancel "to which it is first applied" inserted by amendment filed January 16, 1936

Defendant's Exhibit E.

B 2371

Claim 44, line 14, change "liquid" to "solid"

Add the following claims:

85

~~80.~~ A printing ink which is substantially non-drying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink - the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, and the major part of the liquid component being an aliphatic chemical compound containing carbon, hydrogen and oxygen which dissolves and forms a stable solution with the solid component and which has a vapor pressure as low as the vapor pressure of diethylene glycol monobutyl ether at 20°C. which, at 20°C., is ~~less than 0.05 mm. of mercury~~, and, at 150°C., approximates that of ethyl alcohol at ordinary temperatures.

~~81.~~ A printing ink which is substantially non-drying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink - the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, and the major part of the liquid component being a saturated chemical compound containing carbon, hydrogen and oxygen which dissolves and forms a stable solution with the solid component and which has a vapor pressure which,

B 2275

as low as the vapor pressure of diethylene glycol monobutyl ether at 20°C. at 20°C., is ~~less than 0.06 mm. of mercury~~, and, at 150°C., approximates that of ethyl alcohol at ordinary temperatures.

10 ~~61~~. A printing ink which is substantially non-drying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component completely dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink, the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, substantially all of the liquid component having a vapor pressure at 20°C. as low as the vapor pressure of diethylene glycol monobutyl ether ~~of less than 0.06 mm. of mercury~~ at 20°C., and the major part of the liquid component having an open-chain structure and a vapor pressure which at 150°C. approximates that of ethyl alcohol at ordinary temperatures, and forming a stable solution with the solid component.

11 ~~58~~. A printing ink which is substantially non-drying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component completely dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink, the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, substantially all of the liquid component having a vapor pressure at 20°C. as low as the vapor pressure of diethylene glycol monobutyl ether ~~of less than 0.06 mm. of mercury~~ at 20°C., and the major part of the liquid component having a vapor pressure which at 150°C. approximates that of ethyl alcohol at ordinary temperatures, and being a saturated compound forming a stable solution with the solid component.

12-15

D22[illegible]3 133

Defendant's Exhibit E.

REMARKS

A careful review of the application since allowance indicates that some minor corrections are necessary in the specification and claims. It is requested that the above amendment making these corrections be entered under Rule 78.

The present amendment to the specification is for the purpose of placing the specification as nearly as possible in the form in which it was originally filed. A number of changes in the original specification, which were made in the course of the prosecution and which are not necessary to support the allowed claims, have been eliminated. As these changes are unnecessary, it is believed desirable to avoid the possibility of any argument as to new matter which might be based on them.

The only change made in the specification, apart from those directed to restoring it to its original condition, is a statement inserted on page 4 as to certain chemical properties of the solvent given in the specific example which have proved of value in practical use of the ink described in the example.

New Claims 49, 50, 51 and 52 are of a scope intermediate between that of the broadest allowed claims, 42, 44, and the narrowest allowed claims, 45, 46. Claims 49 and 50 are identical with allowed Claim 42, except that each of them introduces a limitation on the chemical structure of the solvent which has proved important in practice. Claims 51 and 52 similarly describe two species within the scope of Claim 44. It is believed that the

Defendant's-Exhibit E.

Examiner will recognize that applicant is entitled to fortify his protection by claims of a more limited scope within the scope of the allowed claims. In view of the allowance of Claims 42 and 44, Claims 49 to 52 are clearly allowable without an additional search.

It is requested that this amendment be entered promptly in order that the application may be passed to issue.

Respectfully submitted,

ALBERT E. GESSLER,

By _____
His Attorney.

Washington, D. C., March 16, 1936.

ENTRY RECOMMENDED.
UNDER RULE 78.

EXAMINER.

ENTRY APPROVED

ACTING COMMISSIONER OF PATENTS

Defendant's Exhibit E.

Rv. 64 Room 4708

Address only
The Commissioner of Patents,
Washington, D. C.,
and not any official by name

DEPARTMENT OF COMMERCE
UNITED STATES PATENT OFFICE
WASHINGTON

Paper No. 24

All communications respecting this application should give the serial number, date of filing, and name of the applicant

March 18, 1936

MAR 19 1936

Robert W. Byerly,
225 Broadway,
New York, N. Y.

Applicant: Albert E. Gessler

Ser. No. 622,453
Filed July 14, 1932
For Printing Ink

The amendment proposed has been entered under Rule 78.

Commissioner of Patents

622153 136

Defendant's Exhibit E.

Page 2

IN THE UNITED STATES PATENT OFFICE

Application of Albert E. Gessler,
Printing Ink,
Filed July 14, 1932,
Serial No. 622,453.

Div. 64
Room 4[illegible]

30 1936

U. S. PATENT OFFICE
MAR 31 1936
ISSUE DIVISION

STATE OF NEW YORK,)
: ss:
COUNTY OF NEW YORK,)

ALBERT E. GESSLER, whose application for Letters Patent for Improvements in Printing Ink, Serial No. 622,453, was filed in the United States Patent Office on July 14, 1932 being duly sworn, deposes and says that the subject-matter of the amendments filed October 8, 1935 and March 16, 1936 was part of his invention, was invented before he filed his original application, above identified, for such invention, was not known or used before his invention, was not patented or described in a printed publication in any country more than two years before his application, was not patented in a foreign country on an application filed by himself or his legal representatives or assigns more than twelve months before his application, was not in public use or on sale in this country for more than two years before the date of his application, and has not been abandoned.

Albert E. Gessler

Subscribed and sworn to before me
this 28th day of March, 1936.

Arthur C. Jack

622453

137

Defendant's Exhibit E.

MAIL DIVISION
APR 11 1936
U.S. PATENT OFFICE

U. S. PATENT OFFICE
RECEIVED
APR 15 1936
DIVISION 64

PETITION FOR RENEWAL

TO THE COMMISSIONER OF PATENTS:

Your petitioner, ALBERT E. GESSLER, a citizen of the United States, and a resident of Ardsley-on-Hudson, in the County of Westchester, and State of New York, whose Post Office address is c/o The International Printing Ink Corporation, Research Laboratories, 432 West 45th Street, New York City, New York, represents that on July 14, 1932, he filed an application for Letters Patent for Improvements in Printing Ink, Serial No. 622,453, which application was allowed October 10, 1935, but that he failed to make payment of the final fee within the time allowed by law. He now makes renewed application for Letters Patent for said invention, and prays that the original specification and oath may be used as a part of this application.

Signed at New York, in the County of New York, and State of New York, this 10th day of April, 1936.

ALBERT E. GESSLER
By Robert W. Byerly
His Attorney

53 138

Defendant's Exhibit E.

APR 11 36 188784 E - Check -

ROBERT W. BYERLY
COUNSELOR AT LAW
220 BROADWAY

RALPH H. WATSON
APR 11 1936
U.S. PATENT OFFICE

NEW YORK April 10, 1936.

Application of Albert E. Gessler,
Printing Ink,
Filed July 14, 1932,
Serial No. 622,453.

The Commissioner of Patents,
Washington, D. C.

Sir:

I am enclosing herewith Petition for Renewal, check for $30.00 in payment of renewal fee, and amendment in the renewal application.

Very respectfully,

Robert W Byerly

Encls.

622453 M. 41

Defendant's Exhibit E.

Renewal Application of Albert E. Gessler, Printing Ink, Filed July 14, 1932, Serial No. 622,453.

Div. 64
Room 4708

The Commissioner of Patents,

Washington, D. C.

Sir:

I hereby amend as follows:

Add the following claims:

"53. A printing ink which is substantially non-drying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component completely dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink - the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, substantially all of the liquid component having a vapor pressure at 20°C. so low that it has a very slow rate of evaporation at this temperature and the major part of the liquid component having an open-chain structure and a vapor pressure at 150°C. so high that its rate of evaporation at this temperature approximates that of ethyl alcohol at ordinary temperature, and forming a stable solution of the solid component.

"54. A printing ink which is substantially non-drying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component completely dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink - the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, substantially all of the liquid component having a vapor pressure at 20°C. so low that it has a very slow rate of evaporation at this temperature and the major part of the liquid component having ~~an open-chain structure and~~ a vapor pressure at 150°C. so high that its rate of evaporation at this temperature approximates that of ethyl alcohol at ordinary temperature, ~~and forming a stable solution of the solid component.~~ and being a saturated compound forming a stable solution with the solid component.

"55. A printing ink which is substantially non-drying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component completely dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink - the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, substantially all of the liquid component having at 20°C. a sufficiently low vapor pressure to make the ink stable for all ordinary printing conditions

and the major part of the liquid component having at 150°C. a sufficiently high vapor pressure to make its rate of evaporation at this temperature approximate that of ethyl alcohol at ordinary temperature, and forming a stable solution with the solvent.

"56. A printing ink comprising a coloring material and a vehicle therefor containing a thickening agent and a solvent with sufficiently low vapor pressure at 20°C. to make the ink stable for all press-room printing conditions and a sufficiently high vapor pressure at 100°C. to permit rapid drying of the ink by evaporation of the solvent by the application of heat to material on which the ink is printed.

"57. A printing ink consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink - the solid component being low-viscosity nitrocellulose, and substantially all the liquid component being composed of slightly volatile solvents and non-volatile plasticizers for nitrocellulose and having approximately the following composition: 55 parts of slightly volatile solvent for nitrocellulose having a vapor pressure which, at 150°C., approximates that of ethyl alcohol, and from 10 to 20 parts of a non-volatile plasticizer for nitrocellulose.

"58. A printing ink consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component dissolved in the liquid component in sufficient quantity to give the ink the

consistency of an ordinary oil-varnish printing ink, the solid component being low-viscosity nitrocellulose and the liquid component having approximately the following composition: one part of substantially non-volatile plasticizer for nitrocellulose, and three parts of a slightly volatile solvent for nitrocellulose.

"59. A printing ink consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink, the solid component being low-viscosity nitrocellulose, and the liquid component having approximately the following composition: over 50% of slightly volatile solvent for nitrocellulose, and over 25% of substantially non-volatile plasticizer for nitrocellulose.

"60. A printing ink consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component present in the liquid component in sufficient quantity to give the ink the consistency of ordinary oil-varnish ink, the vehicle comprising low-viscosity nitrocellulose, a slightly volatile solvent for nitrocellulose, a non-solvent softener for nitrocellulose and a substantially non-volatile solvent plasticizer for nitrocellulose, the slightly volatile solvent being a major proportion of the liquid component of the vehicle and the solvent plasticizer amounting to at least 15% of the liquid component.

"61. A printing ink consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component dissolved in the liquid component in sufficient quantity to give the ink the consistency of ordinary oil-varnish ink, the solid component being low-viscosity nitrocellulose and the liquid component comprising a major proportion of slightly volatile solvent for nitrocellulose and a substantially non-volatile plasticizer for nitrocellulose amounting to over 15% of the total liquid component and over one-fifth of the amount of nitrocellulose and to about one-fifth of the volatile part of the liquid component."

REMARKS

The above amendment presents new claims which are believed to be necessary to cover adequately all the new and useful features of the invention described in this application.

While the vapor pressure of the preponderant solvent specified in the allowed claims is a novel and important feature of applicant's ink as has been pointed out in the arguments filed in previous amendments, in view of the action of the Office on other applications there appears to be no reason why applicant should be limited to a numerical statement of the vapor pressure.

Defendant's Exhibit E.

New Claims 53 and 54 are based on allowed Claims 51 and 52, but specify the required vapor pressures by their effect on evaporation rate rather than numerically. It is apparent from the arguments previously presented that the value of applicant's ink arises from the different evaporation rates of the solvent at different temperatures, and it is believed that at least some claims should refer directly to evaporation rates. Claims 53 and 54 distinguish from the references in the same way as Claims 51 and 52 and differ from them only in specifying a characteristic of the solvent which is even more directly related to the utility of the ink.

New Claim 55 is based on allowed Claim 44 and differs from it only in specifying the vapor pressures by their effect on the evaporation rate instead of numerically. This claim distinguishes from the references in the same way as Claim 44.

New Claim 56 is somewhat broader, as it specifies the vapor pressures by their effect on the ink and thus avoids the necessity of specifying proportions of ingredients. As already fully pointed out, no one of the references describes an ink having the characteristics specified in Claim 56 and, in view of the practical importance of the invention, it is submitted that applicant is entitled to a claim of this scope.

A feature of applicant's ink not covered by the allowed claims is the proportioning of the solvent and plasticizer. This proportioning has been found to be important in an ink in which the binder is nitrocellulose and to be effective in producing a quick-drying ink which

does not dry on the press even when the slightly volatile solvent used is outside the vapor pressure range specified in the allowed claims.

New Claims 57 to 61 specify the proportion of the substantially non-volatile plasticizer in relation to other ingredients of the ink. The proportions specified as based on the example given in the specification have been carefully compared with those of the inks of all the references and have been found to distinguish from all of them. In connection with these claims, it should be noted that the particular example given in the specification includes two softeners or plasticizers both of which are substantially non-volatile and one of which, dibutyl phthalate, is a solvent plasticizer for nitrocellulose, while the other, blown castor oil, is a softener, but not a solvent, for nitrocellulose. Claim 60 specifies the use of both the two sorts of softeners.

Favorable consideration of the new claims and re-allowance are requested.

Respectfully submitted,

ALBERT E. GESSLER

By Robert W Byerly

His Attorney

New York City, April 10, 1956.

Defendant's Exhibit E.

287

MAY 4 1936

U.S. PATENT OFFICE

Renewal Application of Albert E. Gessler, Printing Ink, Filed July 14, 1933, Serial No. 682,455.

Div. 64
Room 4708

U. S. PATENT OFFICE
RECEIVED
MAY 5 1936
DIVISION 64

The Commissioner of Patents,
Washington, D. C.

Sir:-

I hereby amend as follows:

Claim 53, last line, after "solution" change "of" to "with"

Claim 54, lines 13, 14, cancel "an open-chain structure and" -- last two lines, change "and forming a stable solution of the solid component" to "and being a saturated compound forming a stable solution with the solid component"

REMARKS

The above amendment is made to correct clerical errors contained in the amendment dated April 10, 1936.

Respectfully submitted,

ALBERT E. GESSLER

By Robert M. Hyatt
His Attorney

New York City,
May 2, 1936.

Div. 64 Room 4708

Address only "The Commissioner of Patents, Washington, D. C." and not any official by name. SC/hc

DEPARTMENT OF COMMERCE
UNITED STATES PATENT OFFICE
WASHINGTON

Paper No. 29

All communications relating this application should give the serial number, date of filing, and name of the applicant

Please find below communication from the EXAMINER in charge of this application.

Commissioner of Patents.

Applicant: Albert E.Gessler

Ser. No. 622,453
Filed July 14, 1932
For Printing Ink

Robert W. Byerly,
225 Broadway,
New York, N. Y.

MAIL
JUN 26 1936

In response to amendments filed Apr. 11 and May 4, 1936.

Claim 56, line 6, "permit" is impositive. Ex parte Jones et al 353 O. G. 4.

Claims 53, 54, 55 and 56 are rejected as unpatentable over Clewell, Doughty, Middleton or Schneider of record, all of whom have solvents which may be considered low vapor pressure solvents.

Such terms as "low", "high", "slow" are comparative and indefinite and are not patentable distinctions. Note In Re Short, 432 O. G. 513.

Applicant has only one specific solvent disclosed and apparently has no basis for claiming low vapor pressure solvents broadly.

Claims 57, 58, 59, 60 and 61 are rejected as unpatentable over 360,815 of record who uses low vapor pressure solvents together with plasticizers such as blown castor oil. The proportions are thought to be a matter of choice although in the first example of 360,815, a relatively small amount of blown castor oil is used relatively to the solvent.

In claims 58 and 59 the proportions of "one part to three parts" and "over 50%" and "over 25%" are not found in the description as critical percentages, and the exact basis therefor is not clear.

Likewise "over 15%" and "over 1/5" and "about 1/5"

in claims 60 and 61 are not found in the original description.

As no new references have been cited, the rejection of claims 53 to 61 inclusive, is made final.

The remaining claims stand allowed.

Examiner.

No. 64 Room 4708

DEPARTMENT OF [redacted]

UNITED STATES PATENT OFFICE

SC/hc

Please find below a communication from the EXAMINER in charge of this application.

Commissioner of Patents

Applicant: Albert E. Gessler

Ser. No. 622,453
Filed July 14, 1932
For Printing Ink

Robert W. Byerly,
225 Broadway,
New York, N. Y.

MAILED
SEP 2 - 1936

Supplemental to office action of June 26, 1936.

Additional reference is cited:

Brewer et al, "Vapor Pressure of Some Commercial High-Boiling Organic Solvent, pages 1, 4, 10, 11, 17 and 18 (1936), copy in Dov. 64 (134-56)

This action is supplemental to the Office action of June 26, 1936 and accordingly the final rejection is withdrawn. This supplemental action is made in view of the Brewer et al publication which gives some recent data upon the vapor pressures of terpineol and terpinyl acetate, and which were not available to the examiner at the time of the last Office action.

Upon reconsideration, claim 1, (original claim 42) is rejected as directly readable upon Doughty 1,439,696 of record who discloses the use of a resin dissolved in either terpineol or terpinyl acetate.

Brewer et al disclose terpineol as having a vapor pressure of .05 mm. of mercury at 20° C. and a vapor pressure of 100 mm. at 150° C. They also disclose terpinyl acetate as having a vapor pressure of .025 mm. of mercury at 20° C. and avapor pressure of 56 mm. at 150° C. The broad term of "approximates that of ethyl alcohol at ordinary temperatures" is thought to be readable upon these vapor pressures of Doughty at 150° mm.

Claim 2 (original claim 43) is rejected similarly

as directly [redacted] upon Doughty who uses four parts of rosin to one part of the solvent as thus uses [redacted] which is considered to be "substantially 73%" as claimed.

Claim 3 (original claim 44), is likewise rejected as directly readable upon Doughty.

Claim 6 (original claim 47) is rejected as substantially met by Doughty who preferably uses 20% of resin, but states on page 2, lines 45 to 48, that the proportions of resin and solvent may be varied to produce a vehicle of proper consistency.

Claim 7 (original claim 48) is rejected as substantially met by Doughty who uses a resin, and applicant considers resins and cellulose as equivalents.

Claims 55 and 56 are additionally rejected as directly readable upon Doughty.

Claims 53 to 61 inclusive stand rejected for the reasons and references as stated in the last Office action.

Claims 4, 5, 8, 9, 10 and 11 are allowable as now advised.

S.C

Sept 2, 1936

V. J. R.

Examiner

Examiner

Defendant's Exhibit E.

VAPOR PRESSURE

of

Some Commercial High-Boiling Organic Solvents

Copyright, 1936, Reinhold & Company, Philadelphia, Penna.

Any one who has had occasion to consult the chemical literature for vapor pressure data on organic solvents realizes the scarcity of such information, and it was for this reason that the following investigation was carried out. The purpose of the writer has been to obtain sufficient data to construct accurate vapor pressure-temperature curves in the region 20° C. to 150° C. for eleven commercial high-boiling organic solvents. The samples of solvents used were not specially purified compounds, but were technical products as actually used in the chemical industries.

Source of Materials

The samples of solvents upon which the vapor pressure measurements were made were obtained from the following sources:

Substance	Source
"Carbitol", (Diethylene-glycol mono-ethyl ether)	Carbide and Carbon Chemicals Corp.
"Butyl Carbitol", (Diethylene glycol mono-butyl ether)	Carbide and Carbon Chemicals Corp.
Dimethyl phthalate	Commercial Solvents Corporation
Dibutyl phthalate	Commercial Solvents Corporation
Terpineol	E. I. du Pont de Nemours & Co.
Terpenyl acetate	E. I. du Pont de Nemours & Co.
Benzyl alcohol	E. I. du Pont de Nemours & Co.
Benzyl acetate	E. I. du Pont de Nemours & Co.
"Hexalin", (Cyclohexanol)	E. I. du Pont de Nemours & Co.
"Tetralin", (Tetrahydronaphthalene)	E. I. du Pont de Nemours & Co.
"Decalin", (Decahydronaphthalene)	E. I. du Pont de Nemours & Co.

Identification of Materials

On each sample of solvent a sufficient number of physical constants was obtained to establish its identity definitely. In all cases the boiling point at atmospheric pressure, the density, and the refractive index were determined. In addition to these constants, the comparison of the vapor pressure data recorded in the literature (where available) with the results obtained by the writer has a certain weight in confirming the identity of the samples. Tables 1, 2, and 3 give the constants of the materials used, together with a comparison with recorded data.

Defendant's Exhibit E.

Table #4
"Carbitol"

Temp °C	Vapor pressure mm Hg
39.4	0.8
45.5	0.9
50.4	1.3
55.0	1.5
61.0	1.8
65.6	2.6
70.8	3.7
76.5	5.5
79.7	6.4
89.9	11.7
100.9	20.6
111.7	34.7
119.8	51.1
135.2	90.6
151.0	183.2

Table #5
"Butyl Carbitol"

Temp °C	Vapor pressure mm Hg
59.2	0.2
53.7	0.3
60.5	0.4
62.9	0.5
66.9	0.7
70.6	1.4
78.7	1.7
82.4	2.0
88.0	3.1
92.3	4.2
100.4	6.4
109.1	9.9
117.6	15.0
126.8	22.9
144.9	50.1
152.9	69.3

Table #6
Dimethyl Phthalate

Temp °C	Vapor pressure mm Hg
82	0.3
85	0.4
90	0.5
99	0.6
103	0.9
105.3	1.2
107.4	1.6
110.6	1.7
113.0	2.0
118.0	2.4
118.8	2.5
123.8	3.3
129.5	4.4
136.9	6.1
146.5	9.7
146.9	9.7
150.6	11.5
151.0	11.6

Table #7
Dibutyl Phthalate

Temp °C	Vapor pressure mm Hg
89	0.1
98.8	0.4
106.1	0.6
111.3	0.8
122.5	0.9
132.0	1.0
134.5	0.9
137.2	1.0
138.0	1.0
141.0	1.1
141.2	1.1
144.8	1.2
145.4	1.1
147.5	1.3
148.0	1.2
149.5	1.3
150.0	1.4
151.0	1.3
153.5	1.5
162.9	2.1
164.4	2.2
167.2	2.8
168.0	2.8
168.6	2.9
171.8	3.2
176.3	4.1

Table #8
Terpineol

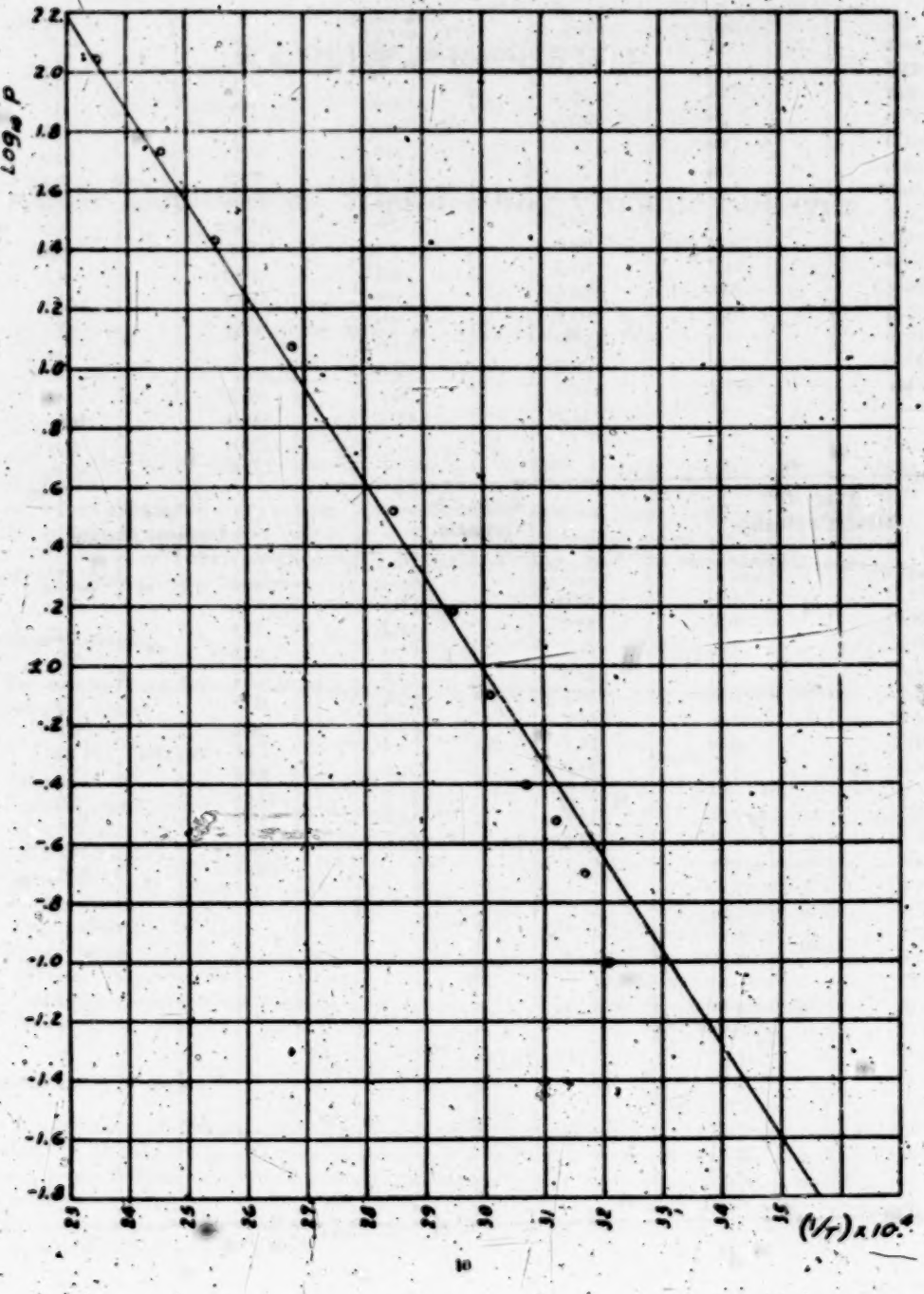
Temp °C	Vapor pressure mm Hg
39.0	0.1
42.0	0.2
47.2	0.3
53.4	0.4
58.7	0.8
65.7	1.5
78.3	3.3
99.7	11.7
118.5	27.2
133.5	53.5
152.8	109.1

Table #9
Terpenyl Acetate

Temp °C	Vapor pressure mm Hg
37.0	0.1
52.5	0.2
55.0	0.3
57.4	0.3
60.8	0.5
64.2	0.8
74.1	1.4
82.8	2.3
102.3	7.0
119.8	16.6
134.5	31.3
150.2	59.0

Defendant's Exhibit K.

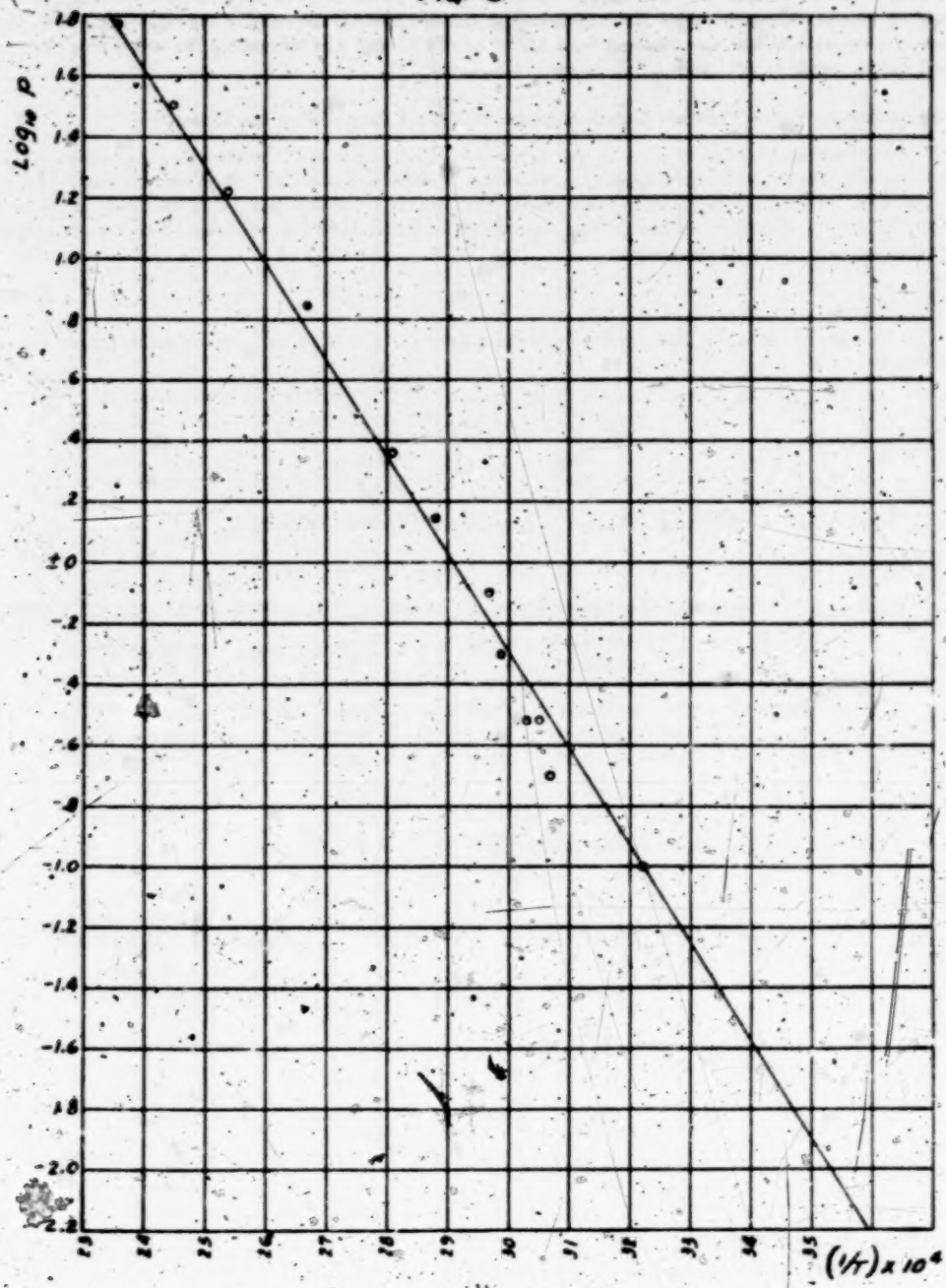
FIG. 5 TERPINEOL



Defendant's Exhibit E.

FIG 6

TERPENYL ACETATE.



Defendant's Exhibit E.

33
E

Most of the data are in agreement with this equation, but occasionally there is a slight tendency to deviate from the straight line, especially at pressures below 1 mm. This tendency is most pronounced in the case of dibutyl phthalate, where the measurements below 1 mm are displaced to the right of the line. However, a good straight line was obtained from 135°C to 176°C, and it is believed by the writer that extrapolation may be made to 0°C with a fair degree of accuracy.

Comparison of Vapor Pressure Determinations with Data Reported in the Literature

The meagreness of the vapor pressure data reported in the chemical literature on the compounds which have been the subject of this investigation is surprising. However, some data are available (usually on pure compounds), and are quite generally in agreement with the vapor pressure determinations made by the writer. The following is a review of the available measurements taken from the literature, with a comparison of the measurements made by the writer:

"Carbitol"

J. G. Davison[1] gives a vapor pressure-temperature curve for "Carbitol". Some points taken from the curve are

Temp., °C	Pressure, mm Hg
20	0.14
50	1.1
100	18.0
140	100.0

If these results are plotted on Figure 1, a very close agreement is observed.

Terpineol

Pickett and Peterson[4] give vapor pressure data on a-terpineol. The portion of their data up to 172°C is

Temp. °C	Pressure, mm Hg	Temp. °C	Pressure, mm Hg
83.8	5.9	106.6	19.2
89.9	8.1	107.3	20.1
90.6	8.6	107.9	20.6
94.7	9.6	108.2	20.7
100.0	12.6	140.9	72.6
100.9	12.7	142.3	73.7
105.8	18.6	172.0	207.2

and is found to be in agreement with our results.

Benzyl Alcohol

Data on benzyl alcohol exist in several places. The data given by Kahlbaum[5], and recorded in Landolt-Bornstein, follows:

Temp. °C	Pressure, mm Hg	Temp. °C	Pressure, mm Hg
60.9	1	109.7	25
67.8	2	113.4	30
72.9	3	116.7	35
77.2	4	119.6	40
80.8	5	122.2	45
92.6	10	124.4	50
99.9	15	133.9	75
105.3	20	141.3	100
		152.1	150

This shows satisfactory agreement with our data. The data reported for benzyl alcohol in International Critical Tables apparently comes from the same source.

Defendant's Exhibit E.

Hexalin

Some isolated values are given in the literature for the vapor pressure of "Hexalin". Weissenberger & Schuster[1] give 0.42 mm at 20°C. This does not agree with our data.

Tetralin

International Critical Tables[2] gives the following data of Herz and Schuftan[3]:

Temp. °C	Pressure, mm Hg
100	26.3
140	118
160	219

This agrees with our experimental measurements.

Limler[4] gives some results of the measurement of vapor pressure of tetralin:

Temp. °C	Pressure, mm Hg
—2.4	0.015
—1.2	0.0235
25.0	0.40
65.0	0.83

The value 0.40 mm at 25°C checks our findings; however, the value at 65°C, i.e., 0.83 mm, quite evidently is not correct. This is apparently a typographical error.

Decalin

Weissenberger, Henke and Sperling[5] give a value of 0.6 mm Hg at 20°C for "Decalin". We find 0.8 mm at 20°C.

The data of Herz and Schuftan[3], given in International Critical Tables agrees with the values found by us.

Values for Vapor Pressures at 20°C and 150°C

As a matter of convenience we give in Table 15 interpolated (or extrapolated) values for the vapor pressure of the eleven samples of solvents at 20°C and 150°C. These data have been obtained from plots of the experimental data according to the Clapeyron equation (logarithm of vapor pressure against reciprocal of absolute temperature). The number of significant figures used expresses the probable degree of accuracy.

Table #15

Values for Vapor Pressures at 20°C and 150°C

Substance	Vapor pressure at 20°C, mm Hg	Vapor pressure at 150°C, mm Hg
"Carbitol"	0.13	174
"Butyl Carbitol"	0.020	66
Dimethyl phthalate	0.003	11.5
Dibutyl phthalate	0.001	1.4
Terpineol	0.05	100
Terpenyl acetate	0.025	56
Benzyl alcohol	0.10	132
Benzyl acetate	0.13	110
"Hexalin"	0.8	560
"Tetralin"	0.28	151
"Decalin"	0.8	240

Defendant's Exhibit E.

31
E

Renewal Application of Albert E. Gessler, Div. 64
Printing Ink, Room 4708
Filed July 14, 1932,
Serial No. 618,453.

U. S. PATENT OFFICE
RECEIVED

The Commissioner of Patents,
Washington, D. C.

Sir:

In view of the supplemental action, dated September 2, 1936, withdrawing the final rejection and citing new art, it is presumed that the statutory period for reply runs from September 2, 1936, rather than from June 26, 1936.

Respectfully,

Robert P. Byerley
Attorney for Albert E. Gessler

New York City, December 11. 1936.

Defendant's Exhibit E.

64 Room 4708

Address only "The Commissioner of Patents, Washington, D. C." and not any official by name SC/hc

DEPARTMENT OF COMMERCE
UNITED STATES PATENT OFFICE
WASHINGTON

Paper No. 32

All communications respecting this application should give the serial number, date of filing, and name of the applicant

Please And below a communication from the EXAMINER in charge of this application.

Conway P. Coe
Commissioner of Patents.

Applicant: Albert E. Gessler

Robert W. Byerly,
225 Broadway,
New York, N. Y.

Ser. No. 622,453
Filed July 14, 1932
For Printing Ink

MAILED
DEC 15 1936

In response to letter filed Dec. 12, 1936.

In view of the withdrawal of the final rejection, the statutory period for a reply runs from Sept. 2, 1936.

S.C.

R. M. Nash
Examiner.

Defendant's Exhibit E.

33
E

2 937 Renewal Application of Albert E. Gessler, Printing Ink, Filed July 14, 1938, Serial No. 622,455. Div. 54 Room 4706

The Commissioner of Patents,

Washington, D. C.

Sir:

In response to the Office Action of June 26, 1936 and the supplemental Action of September 2, 1936, I hereby amend as follows:

Cancel the insert following line 16, page 4 of the Specification, made by amendment of October 8, 1935, and insert in place thereof the following:

The diethylene glycol monobutyl ether may be replaced by other solvents or solvent mixtures possessing a similar low rate of evaporation at ordinary temperatures and a marked acceleration of volatility at raised temperatures. These important properties of diethylene glycol monobutyl ether, the preponderant solvent constituting the major part of the liquid component of the ink in the example given, may, for comparative purposes, be indicated numerically in terms of its vapor pressure at different temperatures which, as determined by Brewer and Gardner in "Industrial and Engineering Chemistry", Vol. 29, No. 2, p. 179, February, 1937 are as follows:

At 20°C.		0.02 mm. of mercury
At 100°C.		6.4 mm. of mercury
At 150°C.	about	60.0 mm. of mercury

These vapor pressures indicate that, at elevated temperatures, this solvent becomes a highly volatile liquid like such highly volatile liquids as, for example, ethyl alcohol which has a vapor pressure of about 40 mm. at ordinary room temperature. The vapor pressures of my preponderant solvent

B 2266

at elevated temperatures contrast sharply with those of the high boiling solvents ordinarily termed "plasticizers" such as dibutyl phthalate, a minor proportion of which is used in the specific formula given. The vapor pressure of this liquid, according to Brewer and Gardner, is 0.45 mm. at 100°C. and 1.4 mm. at 150°C. The vapor pressures of diethylene glycol monobutyl ether indicate that this solvent will evaporate almost instantaneously at elevated temperatures like ethyl alcohol at ordinary temperatures, while such high boiling solvents or plasticizers as dibutyl phthalate evaporate only slowly when heated to temperatures of 100°C. or 150°C.

Claim 1 (original 42), line 2 from the end, change "less than 0.06 mm. of mercury" to "as low as the vapor pressure of diethylene glycol monobutyl ether at 20°C."

Claim 2 (original 43), line 3 from the end, change "less than 0.06 mm. of mercury" to "as low as the vapor pressure of diethylene glycol monobutyl ether at 20°C."

Claim 3 (original 44), lines 10-11, change "of less than 0.06 mm. of mercury" to "at 20°C. as low as that of diethylene glycol monobutyl ether"

Claim 4 (original 45), next to last line, change "below 0.06 mm. of mercury" to "as low as the vapor pressure of diethylene glycol monobutyl ether at 20°C.,"

Claim 6 (original 47), line 7, change "below 0.06 mm." to "as low as the vapor pressure of diethylene glycol monobutyl ether at 20°C.,"

622453
56

B 2276

Claim 7 (original 49), lines 11-12, change "less than 0.06 mm. of mercury" to "as low as the vapor pressure of diethylene glycol monobutyl ether at 20°C.,"

Claim 8 (original 49), line 5 from the end, change "less than 0.06 mm. of mercury" to "as low as the vapor pressure of diethylene glycol monobutyl ether at 20°C."

Claim 9 (original 50), line 2 from the end, change "less than 0.06 mm. of mercury" to "as low as the vapor pressure of diethylene glycol monobutyl ether at 20°C."

Claim 10 (original 51), line 11, change "of less than 0.06 mm. of mercury" to "at 20°C. as low as the vapor pressure of diethylene glycol monobutyl ether"

Claim 11 (original 52), line 11, change "of less than 0.06 mm. of mercury" to "at 20°C. as low as the vapor pressure of diethylene glycol monobutyl ether"

Cancel Claims 53 to 56, inclusive, and insert in place thereof, the following claims:

12 "53. A printing ink adapted for use on paper, comprising a coloring material in a vehicle containing essentially a binder for the coloring material and a solvent for the binder, said binder forming a stable solution in said solvent and being present in amount sufficient to give the ink the consistency of ordinary oil-varnish printing inks, and to protect the coloring material against being rubbed off when the ink is applied by an ordinary printing press, and substantially all of said solvent having a vapor pressure at 20°C. as low as that of diethylene glycol monobutyl ether at 20°C., and developing such a marked increase in vapor pressure at elevated temperatures of 100°C. or above, to which printed paper can be subjected, that its vapor pressure at 150°C. approximates that of ethyl alcohol at ordinary temperatures and that it practically immediately

2453

157

evaporates from a thin film of ink at such temperatures, whereby said ink is stable on the printing press and capable of being immediately dried upon the application of heat following the printing operation.

"58. A printing ink consisting of pigment dispersed in an organic viscous vehicle, consisting of a liquid component and a solid component -- the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, and being dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink, and to bind the pigment to paper when the ink is applied by an ordinary printing press, and substantially all of the liquid component having a vapor pressure at 20°C. which is as low as the vapor pressure of diethylene glycol monobutyl ether at 20°C. and the major part of the liquid component having a vapor pressure which at 150°C. approximates that of ethyl alcohol at ordinary temperatures, and forming a stable solution with the solid component.

"64. A printing ink comprising a coloring material in a vehicle consisting of a solid component, composed principally of a binder of the group consisting of natural and synthetic resins and cellulose esters, and a liquid component, composed principally of volatilizable solvent for the binder, said binder being present in amount approximately one-half to two-thirds of said liquid component, by weight, and said solvent having a vapor pressure at 20°C. as low as that of diethylene glycol monobutyl ether at room temperatures of 20°C., and having a vapor pressure at 150°C. equivalent to that of ethyl alcohol at room temperature."

Cancel Claims 57 through 61, inclusive, and insert in place thereof the following claim:

Defendant's Exhibit E.

A printing ink having a consistency suitable for ordinary printing and comprising a coloring material and a vehicle therefor including a liquid component and a solid component, said solid component being principally a binder for said coloring material, and said liquid component consisting essentially of a minor proportion of an agent adapted to prevent brittleness of the binder and a major proportion of a volatilizable solvent having vapor pressure at 20°C. as low as that of diethylene glycol monobutyl ether at room temperatures of 20°C., and a vapor pressure at elevated temperature of 150°C. equivalent to that of ethyl alcohol at ordinary room temperature.

Defendant's Exhibit E.

REMARKS

The Examiner's courtesy in granting the inventor and his attorneys an interview is appreciated, and in accordance with the understanding at the interview, the claims have been revised, and are all believed to be now clearly allowable.

Claims 1, 2, 3, 6 and 7 (formerly 42, 43, 44, 47 and 48), which were all once allowed, have been amended to recite a solvent which possesses a vapor pressure at 20°C. as low as the vapor pressure of diethylene glycol monobutyl ether at 20°C.

As pointed out at the interview, the application as originally allowed, recited the vapor pressure of diethylene glycol monobutyl ether as between 0.05 and 0.06 mm at 20°C. This figure for the vapor pressure was obtained by the method of Crater, as described in "Industrial and Engineering Chemistry", Vol. 21, p. 674, July, 1929. However, due to the fact that there is no generally accepted method of determining vapor pressures at low temperatures, which affords an absolute standard, and due also to the fact that different samples of solvents may contain substantial traces of impurities such as water, which affect the results, the Specification has been revised to specify the figures recently reported by Brewer and Gardner in "Industrial and Engineering Chemistry" for February, 1937. However, it should be noted that there are certain scientific reasons for possible inaccuracies in the Brewer & Gardner determinations. Therefore, the figures given in the Specification must be taken, not as absolute standards, but rather as the vapor pressure figures recently obtained by Brewer and Gardner, and comparable with other figures in their publication.

Defendant's Exhibit E.

claims 1, 2, 5, 6 and 7, now distinguish from the references in the recital of a printing ink having the consistency of ordinary oil-varnish printing inks and based upon a solvent having a vapor pressure at 20°C. as low as that of diethylene glycol monobutyl ether at 20°C., and having a vapor pressure at 150°C. which approximates that of ethyl alcohol at ordinary temperatures. On the basis of the Brewer & Gardner figures, Doughty's preferred solvent has a vapor pressure of .05 mm. at 20°C., as compared to .02 mm. for diethylene glycol monobutyl ether. The Middleton and Clewell patents are even less pertinent than Doughty, relate merely to thin inks for automatic numbering machines for applying footage numbers to motion picture film, and have been fully discussed at pages 9, 11 and 12 of the amendment filed October 8, 1935. The Schneider patent discloses only plasticizers which do not exhibit the specified vapor pressures at 150°C.

The Examiner's objection to the breadth of the claims was discussed at the interview, when it was agreed that the definition of the physical characteristics of the preferred solvent is sufficient to enable those skilled in the art to select appropriate substitutes.

In order to make allowed Claims 4 and 8 to 11 agree with the approved terminology, these claims have been similarly amended with regard to the recital of the vapor pressures.

Defendant's Exhibit E.

Accordingly, it is believed that all of Claims 1 to 11, which were once allowed, are now properly allowable as indicated at the interview.

Two new claims, numbered 62 and 63, were discussed at the interview, and were deemed allowable since they incorporate the features of the other claims heretofore discussed, and are somewhat more precise in other respects. The allowability of new Claims 64 and 65 is further emphasized by the recital of proportions. With regard to Claim 65, which replaces Claims 57 through 61, inclusive, it is noted that the British Patent 360,815 does not disclose the basic features of these claims, for the reasons pointed out above, and under these circumstances it is submitted that applicant is entitled to specific claims to the embodiment including the ink containing the ingredient which eliminates brittleness in the product, in accordance with In re Laursen, 24 U.S.Pat.Q. 11, 17, C.C.P.A.

Since applicant has complied with all the Examiner's suggestions made at the interview, and has placed the case in condition for immediate allowance, such action is solicited.

Respectfully submitted,

ALBERT E. GESSLER

By Robert W. Byerly
His Attorney

New York City,
March 1st, 1937.

ADDRESS ONLY
THE COMMISSIONER OF PATENTS
WASHINGTON, D. C.

181

Serial No. 622,453

DEPARTMENT OF COMMERCE
UNITED STATES PATENT OFFICE
WASHINGTON

June
Four
1937

JUN 4 - 1937

IN REMITTING THE FINAL FEE GIVE THE SERIAL NUMBER AT THE HEAD OF THIS NOTICE.

UNCERTIFIED CHECKS WILL NOT BE ACCEPTED.

Your APPLICATION for a patent for an IMPROVEMENT in

filed. has been examined and ALLOWED with 1 claims.

The final fee, THIRTY DOLLARS, WITH $1 ADDITIONAL FOR EACH CLAIM ALLOWED IN EXCESS OF 20, must be paid not later than SIX MONTHS from the date of this present notice of allowance. If the final fee be not paid within that period, the patent will be withheld, but the application may be renewed within one year after the date of the original notice with a renewal fee of $30 and $1 additional for each claim in excess of 20.

The office delivers patents upon the day of their date, on which date their term begins to run. The preparation of the patent for final signing and sealing will require about four weeks, and such work will not be begun until after payment of the necessary final fee.

When the final fee is paid, there should also be sent, DISTINCTLY AND PLAINLY WRITTEN, the name of the INVENTOR, TITLE OF THE INVENTION, AND SERIAL NUMBER AS ABOVE GIVEN, DATE OF ALLOWANCE (which is the date of this circular), DATE OF FILING, and, if assigned, the NAMES OF THE ASSIGNEES.

If it is desired to have the patent issue to an ASSIGNEE OR ASSIGNEES, an assignment containing a REQUEST to that effect, together with the FEE for recording the same, must be filed in this office on or before the date of payment of the final fee.

After issue of the patent, uncertified copies of the drawings and specifications may be purchased at the price of TEN CENTS EACH. The money should accompany the order. Postage stamps will not be received.

The final fee will NOT be received from other than the applicant, his assignee or attorney, or a party in interest as shown by the records of the Patent Office.

NOTICE. WHEN THE NUMBER OF CLAIMS ALLOWED IS IN EXCESS OF 20, NO SUM LESS THAN $30 PLUS $1 ADDITIONAL FOR EACH CLAIM IN EXCESS OF TWENTY CAN BE ACCEPTED AS THE FINAL FEE.

Respectfully,

Commissioner of Patents.

622453

154

RULE 78

JUN 16 1937

ORDERS No. 2608, 2801, 3311

6
4
37

34
M

U. S. PATENT OFFICE
RECEIVED
JUN 16 1937
DIVISION 64

64

Application of Albert E. Gessler,
Printing Ink,
Filed July 14, 1932,
Serial No. 622,453,
Allowed June 4, 1937.

Div. 64
Room 4708

U. S. PATENT OFFICE
JUN 15 1937
ISSUE DIV.

The Commissioner of Patents,

Washington, D. C.

Sir:

It is requested that the following amendment be entered under the provisions of Rule 78:

Claim 3, next to last line, after "temperatur cancel the comma

Claim 10, next to last line, after "temperatur cancel the comma

Claim 11, line 14, after "temperatures" cancel the comma

Claim 13, line 12, after "20°C." insert a comma -- line 14, after "temperatures" cancel the comma

REMARKS

A review of the allowed claims indicates that some corrections in punctuation are necessary. It is requested that the above amendment be entered promptly in order that the patent may be issued without delay.

Respectfully submitted,

ALBERT E. GESSLER

By Robert W. Byerly
His Attorney

Entered under Order 3311

[illegible]
Acting Examiner.

New York City, June 11, 1937.

622453

Defendant's Exhibit E.

U. S. PATENT OFFICE
JUN 15 1937

STATE OF NEW YORK)
: ss:
COUNTY OF NEW YORK)

ALBERT E. GESSLER, whose application for Letters Patent for Improvements in Printing Ink, Serial No. 622,455, was filed in the United States Patent Office on July 14, 1932, being duly sworn, deposes and says that the subject matter of all the amendments heretofore filed was part of his invention, was invented before he filed his original application, above identified, for such invention, was not known or used before his invention, was not patented or described in a printed publication in any country more than two years before his application, was not patented in a foreign country on an application filed by himself or his legal representatives or assigns more than twelve months before his application, was not in public use or on sale in this country for more than two years before the date of his application, and has not been abandoned.

Albert E Gessler

Subscribed and sworn to before me
this 14th day of June , 1937.

Carl E Jans

Defendant's Exhibit E.

Div. 64. Room 4708 Paper No. 35

ADDRESS ONLY
THE COMMISSIONER OF PATENTS
WASHINGTON, D. C.

DEPARTMENT OF COMMERCE
UNITED STATES PATENT OFFICE
WASHINGTON

MAILED
JUN 16 1937

June 16, 1937

Robert W. Byerly,
225 Broadway,
New York, N. Y.

Applicant: Albert E. Gessler

Serial No. 622,453
Filed July 14, 1932
For Printing ink

The amendment proposed under Rule 78 has been entered under authority of Commissioner's Order No. 3311.

Acting Examiner

622453

944

Defendant's Exhibit E.

JUN 17 37 241755 E ~Check — 30.00

FINAL FEE PAID TO THE COMMISSIONER OF PATENTS

(Be careful to give correct Serial No.)

Serial No. 622,453

INVENTOR:

Albert E. Geasler

PATENT TO BE ISSUED TO:

The International Printing Ink Corporation

NAME OF INVENTION, AS ALLOWED:

Printing Ink.

DATE OF PAYMENT:

June 17, 1937

FEE:

Thirty Dollars

DATE OF FILING:

July 14, 1932

DATE OF CIRCULAR OF ALLOWANCE:

June 4, 1937

The Commissioner of Patents will please apply the accompanying fee as indicated above.

Robert W. Byerly
Attorney.

SEND PATENT TO

Robert W. Byerly

225 Broadway

New York City

Final fees will not be received from other than the applicant, his assignee or attorney, or a party in interest as shown by the records of the Patent Office, NOR WILL THEY BE APPLIED IN PENDING APPLICATIONS.

62243

Defendant's Exhibit E.

Patented July 13, 1937 2,087,190

UNITED STATES PATENT OFFICE

2,087,190

PRINTING INK

Albert E. Gessler, Ardsley-on-Hudson, N. Y., assignor, by mesne assignments, to The International Printing Ink Corporation, New York, N. Y., a corporation of Ohio

No Drawing. Application July 14, 1932, Serial No. 622,453. Renewed April 11, 1936

15 Claims. (Cl. 134—36)

The present invention relates to printing inks and has for an object the preparation of a novel type of printing ink, which possesses many advantages over the printing inks heretofore known and overcomes many of the disadvantages associated with the procedure which it has been necessary to use in order that such inks may be properly applied to produce a satisfactory print.

Heretofore, printing inks have in general been made by grinding pigments in oils or oil-varnishes, or both. Such oils or varnishes have absolute viscosities of 5 poises or above at 25° C., measured by the method applied to varnish viscosities (Gardner's Physical and Chemical Examination of Paints, Varnishes, etc., fifth edition 1930, pp. 246, 152, 153) and have been characterized by their relatively slow rate of drying depending upon polymerization, oxidation and/or absorption and, as a consequence, have presented great difficulty in printing processes by greatly delaying the speed of operation. This has not only necessitated the expense and maintenance of large and cumbersome auxiliary equipment and extra labor, but has also resulted in a dependency of the printing process upon the time required to obtain a complete drying.

In order to overcome these difficulties, it has been customary to incorporate in the inks varying amounts of driers which have the ability to accelerate the speed of the oxidation and/or polymerization of the oil varnishes. However, even with all possible acceleration, the drying of the prints takes many hours or even days, necessitating in addition to the great delay in time, extra labor to remove, to store, and to return to the machines the printed material and also in many cases a great waste of paper in the form of slip-sheets which must be rolled up or stacked between the prints in order to avoid offsetting, rubbing off, smudging or sticking together.

It has also been proposed to use various types of lacquers in printing processes, particularly cellulose lacquers. As is well known, the cellulose solvents used in these lacquers are characterized by a high degree of volatility. Indeed, this characteristic is considered an advantage in lacquers, for in the ordinary use to which lacquers are put, a rapid drying or hardening is highly desirable. However, it is obvious that such rapid drying renders inks made on this principle unsuitable for printing from plates or rollers; for, while they may be applied to printing plates or rollers, they will quickly dry and harden thereon and they will have only the effect of yielding dry or half dry material to the printing form from which, therefore, no satisfactory impression can be made on the material to be printed.

I have discovered, however, that if in contrast to the above, cellulose compounds, particularly nitrocellulose, are dissolved in solvents with high boiling points, this difficulty may be avoided. Naturally, if the solvents are too slow in evaporating, the same difficulties, which occur in the case of ordinary oil varnish inks, are encountered. In this respect I have found that certain such high boiling solvents, very well adapted to dissolve cellulose compounds, have at room temperature such slow drying properties that, while they may be employed as solvents in this ink, and while an excellent impression may be transferred to the surface to be printed upon, the impression will nevertheless be so moist that it is likely to become blurred or smudged by rubbing after many hours or even days. This defect, however, may be remedied by the present invention, which involves a recognition of the principle that some of these high boiling solvents exhibit, at temperatures elevated above room temperatures, such a remarkable and quick increase in their vapor pressure that they volatilize rapidly, while at the same temperatures others show little change in their vapor pressures and therefore are practically non-volatile.

By room temperatures, I mean the ordinary temperatures of a room in which technical work is carried on, which is generally accepted to be 20° to 25° C.

As above indicated, the present invention makes use of the characteristics of these solvents having high boiling points and high vapor pressures at elevated temperatures.

The referred to solutions, in contradistinction to lacquer solutions which require highly volatile solvents, are characterized by their very low rate of evaporation at temperatures approximating room temperature and by their ability to manifest a relatively high degree of volatility when subjected to temperatures higher than room temperature. The solvents or solvent mixtures utilized in the formation of these solutions may be described as solvents having a high boiling point combined with a low vapor pressure at room temperature, but yet further characterized by a rapid rise in their vapor pressure curves upon elevation of the temperature,—that is, by their property of evaporating quickly from a thin layer, as in a print, when the temperature is sufficiently raised. Among this peculiar class of solvents I have found as an example diethylene glycol monobutyl ether to be a solvent for nitro-

cellulose and many natural and artificial gums, very well adapted to the purposes of this invention. This solvent at room temperatures remains fluid and moist for a long period of time. When heated to about 100° C. or above, the rate of vaporization is greatly accelerated and, when used in the ink of this invention, produces a print which dries almost instantaneously when subjected to such a heat treatment.

The printing ink above briefly described may be further admixed with varying amounts of another and different class of oils or high boiling solvents possessing a very low vapor pressure over a wide range of temperatures, and characterised in that they are practically non-volatile if exposed to the heat necessary for the process. This admixture acts as a plasticiser and tends to prevent the brittle characteristic of a film consisting of nitrocellulose or gums alone.

The following specific example is illustrative of my invention as applied to the production of a yellow printing ink particularly. The ink may be made up as follows: 100 parts of chrome yellow, 35 parts of nitrocellulose (low viscosity), 55 parts of diethylene glycol monobutyl ether, 10 parts of dibutylphthalate, and 10 parts of blown castor oil.

The above composition may, for example, be prepared by grinding or otherwise dispersing the pigment in a solution of the nitrocellulose in diethylene glycol monobutyl ether. The two other ingredients may be introduced in such order as may be expedient. It will, of course, be recognised that the yellow pigment may be replaced by any suitable pigments or dyestuffs and/or mixtures thereof; that the nitrocellulose may be replaced by other cellulose compounds and/or by natural or synthetic resins. Moreover, the dibutylphthalate may be replaced by any other suitable agent, effective to prevent brittleness in the finished product. Also, the blown castor oil which has been included in the specific formula given may be replaced by other suitable materials. It may be desirable in some circumstances to omit the last two types of ingredients referred to in the illustrative formula, namely, those which have been added in order to offset extreme hardness and brittleness.

Diethylene glycol monobutyl ether is a practically odorless, saturated, aliphatic or open-chain chemical compound of carbon, hydrogen and oxygen.

The diethylene glycol monobutyl ether may be replaced by other solvents or solvent mixtures possessing a similar low rate of evaporation at ordinary temperatures and a marked acceleration of volatility at raised temperatures. These important properties of diethylene glycol monobutyl ether, the preponderant solvent constituting the major part of the liquid component of the ink in the example given, may, for comparative purposes, be indicated numerically in terms of its vapor pressure at different temperatures which, as determined by Brewer and Gardner in "Industrial and Engineering Chemistry", vol. 29, No. 1, p. 179, February, 1937, are as follows:

	Mm. of mercury
At 20° C.	0.02
At 100° C.	6.4
At 150° C.	about 60.0

These vapor pressures indicate that, at elevated temperatures, this solvent becomes a highly volatile liquid like such highly volatile liquids as, for example, ethyl alcohol which has a vapor pressure of about 40 mm. at ordinary room temperature. The vapor pressures of my preponderant solvent at elevated temperatures contrast sharply with those of the high boiling solvents ordinarily termed "plasticizers" such as dibutyl phthalate, a minor proportion of which is used in the specific formula given. The vapor pressure of this liquid, according to Brewer and Gardner, is 0.45 mm. at 100° C. and 1.4 mm. at 150° C. The vapor pressures of diethylene glycol monobutyl ether indicate that this solvent will evaporate almost instantaneously at elevated temperatures like ethyl alcohol at ordinary temperatures, while such high boiling solvents or plasticizers as dibutyl phthalate evaporate only slowly when heated to temperatures of 100° C. or 150° C.

With ink prepared as above, the printing operation may be carried out in the ordinary manner and at ordinary temperatures. At the conclusion of the printing operation, the printed materials may be subjected, in known manner, to sufficient heat to dry the thin film of the print very rapidly. Thus a finished print is obtained immediately at the end of the printing and heating operation and no time, labor, nor material is wasted in delays incident to the prolonged drying of the printed goods under the processes at present in use. This method of printing is not claimed herein as it forms the subject matter of my co-pending application, Serial No. 15,944, filed April 12, 1935, which is in part a continuation of this application.

The novel ink and process described above are not only capable of utilisation in printing upon paper, but they are also adapted for use in making very satisfactory prints upon many other surfaces, such as for instance textiles or metallic surfaces, or the lacquered surfaces of Cellophane, or the like, where the production of a satisfactory print has heretofore been much restricted.

It is apparent that such an ink as has been described does not necessitate the admixture of driers, does not set or harden on the printing rollers or plates, but is yet capable of being dried very quickly when subjected to suitable temperatures after being printed, by the evaporation of the solvent from the thin layer of the print. The finished products are flexible prints in which the pigment is well protected against being rubbed off. They are not softened by moisture, grease, or chemical influences and possess practically no odor. The ink adheres securely to almost every type of surface.

What I claim is:

1. A printing ink which is substantially non-drying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink—the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, and the major part of the liquid component being a chemical compound containing carbon, hydrogen and oxygen which dissolves and forms a stable solution with the solid component and which has a vapor pressure which, at 20° C., is as low as the vapor pressure of diethylene glycol monobutyl ether at 20° C., and, at 150° C., approximates that of ethyl alcohol at ordinary temperatures.

2. A printing ink which is substantially non-drying at ordinary temperatures and dries in-

Defendant's Exhibit E.

stantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink—the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, and substantially 73% of the liquid component being a chemical compound containing carbon, hydrogen and oxygen, which dissolves and forms a stable solution with the solid component and which has a vapor pressure which, at 20° C., is as low as the vapor pressure of diethylene glycol monobutyl ether at 20° C., and, at 150° C., approximates that of ethyl alcohol at ordinary temperatures.

3. A printing ink which is substantially non-drying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component completely dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink—the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, substantially all of the liquid component having a vapor pressure at 20° C. as low as that of diethylene glycol monobutyl ether at 20° C., and the major part of the liquid component having a vapor pressure which at 150° C. approximates that of ethyl alcohol at ordinary temperatures and forming a stable solution with the solid component.

4. A printing ink which is substantially non-drying at ordinary temperatures and dries rapidly at 150° C., consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component—being a member of the group cohsisting of natural and synthetic resins and cellulose compounds—dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink, in which the major part of the liquid component is an ether including one butyl radical and one diethylene glycol radical and having a vapor pressure which at 20° C. is as low as the vapor pressure of diethylene glycol monobutyl ether at 20° C., and at 150° C. approximates that of ethyl alcohol.

5. A printing ink which is substantially non-drying at ordinary temperatures and dries rapidly at 150° C., consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component—being a member of the group consisting of natural and synthetic resins and cellulose compounds—dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink, in which the major part of the liquid component is monobutyl ether of diethylene glycol.

6. A printing ink which is substantially non-drying at ordinary temperatures and which dries rapidly at 150° C. consisting of a coloring matter dispersed in a viscous fluid vehicle consisting of a liquid component the major portion of which is an organic solvent forming stable solutions with both nitrocellulose and resin having a vapor pressure which at 20° C. is as low as the vapor pressure of diethylene glycol monobutyl ether at 20° C., and a solid component completely dissolved in the liquid component in an amount at least 47% of the amount of said liquid component, said solid component being a member of the group consisting of natural and synthetic resins and low viscosity cellulose esters.

7. A printing ink which is substantially non-drying at ordinary temperatures and which dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component dissolved in a liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink—the solid component being a cellulose compound, and the major part of the liquid component being a chemical compound which dissolves and forms a stable solution with the solid component and which has a vapor pressure which at 20° C. is as low as the vapor pressure of diethylene glycol monobutyl ether at 20° C., and at 150° C. approximates that of ethyl alcohol at ordinary temperatures.

8. A printing ink which is substantially non-drying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink—the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, and the major part of the liquid component being an aliphatic chemical compound containing carbon, hydrogen and oxygen which dissolves and forms a stable solution with the solid component and which has a vapor pressure which, at 20° C., is as low as the vapor pressure of diethylene glycol monobutyl ether at 20° C., and, at 150° C., approximates that of ethyl alcohol at ordinary temperatures.

9. A printing ink which is substantially non-drying at ordinary temperatures and dries instantly on heating of the printed matter consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink—the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, and the major part of the liquid component being a saturated chemical compound containing carbon, hydrogen and oxygen which dissolves and forms a stable solution with the solid component and which has a vapor pressure which, at 20° C., is as low as the vapor pressure of diethylene glycol monobutyl ether at 20° C., and at 150° C., approximates that of ethyl alcohol at ordinary temperatures.

10. A printing ink which is substantially non-drying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component completely dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink—the solid component being a member of the group consisting of natural and

Defendant's Exhibit E.

vapor pressure at 20° C. as low as the vapor pressure of diethylene glycol monobutyl ether at 20° C., and the major part of the liquid component having an open-chain structure and a vapor pressure which at 150° C. approximates that of ethyl alcohol at ordinary temperatures and forming a stable solution with the solid component.

11. A printing ink which is substantially non-drying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component completely dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink—the solid componeht being a member of the group consisting of natural and synthetic resins and cellulose compounds, substantially all of the liquid component having a vapor pressure at 20° C. as low as the vapor pressure of diethylene glycol monobutyl ether at 20° C., and the major part of the liquid component having a vapor pressure which at 150° C. approximates that of ethyl alcohol at ordinary temperatures and being a saturated compound forming a stable solution with the solid component.

12. A printing ink adapted for use on paper, comprising a coloring material in a vehicle containing essentially a binder for the coloring material and a solvent for the binder, said binder forming a stable solution in said solvent and being present in amount sufficient to give the ink the consistency of ordinary oil-varnish printing inks, and to protect the coloring material against being rubbed off when the ink is applied by an ordinary printing press, and substantially all of said solvent having a vapor pressure at 20° C. as low as that of diethylene glycol monobutyl ether at 20° C., and developing such a marked increase in vapor pressure at elevated temperatures of 100° C. or above, to which printed paper can be subjected, that its vapor pressure at 150° C. approximates that of ethyl alcohol at ordinary temperatures and that it practically immediately evaporates from a thin film of ink at such temperatures, whereby said ink is stable on the printing press and capable of being immediately dried upon the application of heat following the printing operation.

13. A printing ink consisting of pigment dispersed in an organic viscous vehicle, consisting of a liquid component and a solid component—the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, and being dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink, and to bind the pigment to paper when the ink is applied by an ordinary printing press, and substantially all of the liquid component having a vapor pressure at 20° C. which is as low as the vapor pressure of diethylene glycol monobutyl ether at 20° C., and the major part of the liquid component having a vapor pressure which at 150° C. approximates that of ethyl alcohol at ordinary temperatures and forming a stable solution with the solid component.

14. A printing ink comprising a coloring material in a vehicle consisting of a solid component, composed principally of a binder of the group consisting of natural and synthetic resins and cellulose esters, and a liquid component, composed principally of volatilizable solvent for the binder, said binder being present in amount approximately one-half to two-thirds of said liquid component, by weight, and said solvent having a vapor pressure at 20° C. as low as that of diethylene glycol monobutyl ether at room temperatures of 20° C., and having a vapor pressure at 150° C. equivalent to that of ethyl alcohol at room temperature.

15. A printing ink having a consistency suitable for ordinary printing and comprising a coloring material and a vehicle therefor including a liquid component and a solid component, said solid component being principally a binder for said coloring material, and said liquid component consisting essentially of a minor proportion of an agent adapted to prevent brittleness of the binder and a major proportion of a volatilizable solvent having vapor pressure at 20° C. as low as that of diethylene glycol monobutyl ether at room temperatures of 20° C., and a vapor pressure at elevated temperature of 150° C. equivalent to that of ethyl alcohol at ordinary room temperature.

ALBERT E. GESSLER.

Defendant's Exhibit E.

1932

CONTENTS.

Application	papers.	26. Renewal petition	Apr 11-36
Rej		27. Amdt J	11-36
		28. Amdt K	36
REJECTION	SEP 13 1933	29. Final Rejection	JUN 28 1936
		30. Supp. Rej.	Sep 4. 2/36
REJECTION	JUN 4 1934	31. Letter	Dec 12
		32. Letter	Dec. 15/36.
	JUN 5 1934	33. Amdt L	Mar 2-37
		34.	
	Nov. 27/34	35. Approved (336)	June 16-37
		36.	
		37.	
	APR 10	38.	
		39.	
		40.	
		41.	
		42.	
		43.	
		44.	
Amdt K	Oct 1-3	45.	
	Dec	46.	
Notice Hopet	Oct 10	47.	
	Mar	48.	
approved 1698.	Mar 18-31	49.	
	Mar 30 1936	50.	

U. S. PATENT OFFICE
RECEIVED
DIVISION

Defendant's Exhibit E.

Plaintiff's Answers to Defendant's Interrogatories.

To the following interrogatories propounded by defendant under Rules 33 and 34 of the Rules of Civil Procedure, plaintiff makes verified answer by its duly qualified officer, as follows:

1. As to the "printing ink" described in Gessler patent No. 2,087,190, in suit, state as follows:

(a) Has the ink described in said patent been commercially sold by plaintiff, its predecessor, its subsidiary, predecessor of its subsidiary, its or their agent or licensee?

Answer: Yes.

(b) If the answer to Interrogatory 1-a is "Yes", has the ink so sold contained the diethylene glycol monobutyl named in the patent in suit as a solvent for solids of the group consisting of natural and synthetic resins and cellulose compounds?

Answer: Yes.

(c) If the answer to Interrogatory 1-b is "Yes", give (1) the approximate date when plaintiff, its predecessor, its subsidiary, predecessor of its subsidiary, its or their agent or licensee, first sold or offered for sale printing ink containing the diethylene glycol monobutyl ether named in the patent in suit as such solvent, and (2) the name and address of the manufacturer or producer from whom the said diethylene glycol monobutyl ether was obtained.

Answer: (1) April, 1933.

(2) Carbide and Carbon Chemicals Corporation, New York, N. Y.

(d) If the answer to Interrogatory 1-b is "Yes", give the period of sale by plaintiff, its predecessor, its subsidiary, predecessor of its subsidiary, its or their agent or licensee,

of printing ink containing the diethylene glycol monobutyl ether named in the patent in suit as such solvent.

Answer: From 1933 to date, but the sales since 1936 have been small.

(e) Has printing ink sold by plaintiff, its predecessor, its subsidiary, predecessor of its subsidiary, its or their agent or licensee, and claimed by plaintiff to be covered by the patent in suit, contained a substitute solvent for solids of the group consisting of natural and synthetic resins and cellulose compounds, in lieu of the diethylene glycol monobutyl ether named in the patent in suit?

Answer: Yes. In some of the printing inks sold, equivalents have been substituted for the specific illustrative solvent named in the patent.

(f) If the answer to Interrogatory 1-e is "Yes", give the name of each such substitute solvent used in lieu of the diethylene glycol monobutyl ether named in the patent in suit, and (2) the name and address of the manufacturer or producer from whom each such solvent was obtained.

Answer: The equivalent solvents which have been used in place of diethylene glycol monobuty ether (butyl carbitol) are diethylene glycol monobutyl ether acetate (butyl carbitol acetate), purchased from Carbide and Carbon Chemicals Corporation, and high-boiling petroleum fractions, first purchased from American Mineral Spirits Co. and later from other oil companies.

(g) If the answer to Interrogatory 1-e is "Yes", give the date when plaintiff, its predecessor, its subsidiary, predecessor of its subsidiary, its or their agent or licensee, first sold printing ink containing a substitute solvent in lieu of the diethylene glycol monobutyl ether named in the patent in suit.

Answer: Ink containing butyl carbitol acetate as the solvent was first sold by plaintiff's predecessor in February of 1934.

Defendant's Exhibit F.

Ink containing a high-boiling petroleum fraction as the solvent was first sold by plaintiff in July of 1935.

(h) If the answer to Interrogatory 1-e is "Yes", give the period of sale by plaintiff, its predecessor, its subsidiary, predecessor of its subsidiary, its or their agent or licensee, of printing ink containing a substitute solvent in lieu of the diethylene glycol monobutyl ether named in the patent in suit. If more than one such substitute solvent was used, give the answer to this Interrogatory 1-h as to each such substitute solvent, identifying the solvent by name in each case.

Answer: Inks containing butyl carbitol acetate: from 1934 to date.

Inks containing high-boiling petroleum fractions: from 1935 to date.

(i) If the answer to Interrogatory 1-e is "Yes", state the reason for the use in the printing ink sold by plaintiff, its predecessor, its subsidiary, predecessor of its subsidiary, or its or their agent or licensee, of the substitute solvent named in answer to Interrogatory 1-f in lieu of the diethylene glycol monobutyl ether named in the patent in suit. If more than one such solvent was used, give the answer to this Interrogatory 1-i as to each such substitute solvent, identifying the solvent by name in each case.

Answer: Butyl carbitol acetate was used because it is an equivalent of diethylene glycol monobutyl ether (butyl carbitol) which has less effect on rollers composed of glue and glycerin which were used by some printers than does the specific illustrative solvent named in the patent in suit. High-boiling petroleum fractions equivalent to diethylene glycol monobutyl ether (butyl carbitol) were used because they are cheaper than the specific illustrative solvent named in the patent in suit.

(j) If the answer to Interrogatory 1-e is "Yes", state the vapor pressure of each substitute solvent named in the

answer to Interrogatory 1-f as used in lieu of diethylene glycol monobutyl ether named in the patent in suit at 20° C. and at 100° C. and at 150° C.

Answer: The vapor pressure of butyl carbitol acetate is about the same as that of diethylene glycol monobutyl ether (butyl carbitol) at 20° C. and is slightly less than that of diethylene glycol monobutyl ether (butyl carbitol) at the other two temperatures named.

The high-boiling petroleum fractions used have vapor pressures ranging from that of diethylene glycol monobutyl ether (butyl carbitol) to somewhat lower than that of diethylene glycol monobutyl ether (butyl carbitol) at the temperatures mentioned.

2. Submit to defendant's attorneys a one-pound sample of printing ink commercially manufactured for sale by plaintiff, its subsidiary, agent or licensee, which plaintiff claims to be covered by the patent in suit. If different inks are so commercially manufactured, i. e., in the respect that each contains a different solvent than another (regardless of color), submit one-pound samples of such different inks and identify each such sample with the said solvent it contains. Submit also a sample of the solvent contained in each ink sample and state the classes of ingredients in said inks with proportions.

Answer: Plaintiff has submitted to defendant's attorney three one-pound samples of its commercial printing inks containing different solvents and has identified these samples as containing, respectively, butyl carbitol, butyl carbitol acetate and a high-boiling petroleum fraction. Plaintiff has also furnished to defendant's attorney samples of the three solvents contained in the three ink samples. The composition of the ink samples submitted is as follows:

Defendant's Exhibit F.

Ink No. 1

Pigments	59.3%	
Vehicle	40.7%	
	100. %	
Vehicle		
Solvent (Butyl Carbitol)		75.5%
Resin (Nitrocellulose)		24.5%
		100. %

Ink No. 2

Pigments	42.5%	
Vehicle	57.5%	
	100. %	
Vehicle		
Solvent (Butyl Carbitol Acetate)		49.9%
Resins		47.5%
Other Ingredients:		
Solid		0.7%
Liquid		1.9%
		100. %

Ink No. 3

Pigments	29.3%	
Vehicle	70.7%	
	100. %	
Vehicle		
Solvent (High-boiling petroleum fraction)		42.2%
Resins		28.0%
Other ingredients:		
Solid		1.8%
Liquid		28.0%
		100. %

Defendant's Exhibit F.

The "other ingredients" referred to above include wax, drying oil, wetting agents, etc.

3. Give the date when and place (including name and address of establishment) where printing ink that plaintiff claims to be covered by the patent in suit was first used in a printing press for printing on (a) paper, (b) textiles, (c) lacquered surfaces of cellophane, as stated in the patent in suit.

Answer: The ink described in the patent in suit was first used in a printing press for printing on paper at the plant of the Paterson Parchment Paper Company in Passaic, New Jersey, on May 10, 1932.

In so far as plaintiff is informed, the ink has not been used commercially for printing on textiles or "cellophane".

4. If printing ink containing the diethylene glycol monobutyl ether named in the patent in suit as a solvent has been sold since 1936, by plaintiff, its predecessor, its subsidiary, predecessor of its subsidiary, its or their agent or licensee, state (a) the names and addresses of the purchasers thereof, and (b) whether or not in use such ink was dried or set by heat applied to the paper after printing by each of said purchasers.

Answer: (a) Kalamazoo Vegetable Parchment Company, Parchment, Michigan.

(b) Yes, it was so dried.

5. State whether plaintiff, its predecessor, subsidiary, licensee, or agent has given notice to the public of the patent in suit by marking with the patent number under R. S. Section 4900 any inks marketed by it.

Answer: No.

INTERCHEMICAL CORPORATION

By DU VAL R. GOLDTHWAITE

Defendant's Exhibit F:

STATE OF NEW YORK }
COUNTY OF NEW YORK } ss.:

DU VAL R. GOLDTHWAITE, being duly sworn, dep
says:

That he is Chairman of the Board of Dir
Interchemical Corporation, a corporate plaintiff
that he subscribed the foregoing answers to def
interrogatories on behalf of said corporate plain
he has read the answers and knows the contents
and that the same are true and accurate.

DU VAL R. GOLDT

Sworn to and subscribed before me }
this 10th day of December, 1942. }

FANNIE D. SMUL
Notary Public
Notary Public, Queens County
Queens County Clerk's number 3969
Queens County Register's number 4401
Certificate filed in
New York County Clerk's number 2184
New York County Register's number 4-S-1207
Commission expires March 30, 1944

(SEAL)

Defendant's Exhibit G.

Book of Patents and Publications.

(Opposite ☞)

Defendant's Exhibit E.

Patented July 13, 1937 2,087,190

UNITED STATES PATENT OFFICE

2,087,190

PRINTING INK

Albert E. Gessler, Ardsley-on-Hudson, N. Y., assignor, by mesne assignments, to The International Printing Ink Corporation, New York, N. Y., a corporation of Ohio

No Drawing. Application July 14, 1932, Serial No. 622,453. Renewed April 11, 1936

15 Claims. (Cl. 134—36)

The present invention relates to printing inks and has for an object the preparation of a novel type of printing ink, which possesses many advantages over the printing inks heretofore known and overcomes many of the disadvantages associated with the procedure which it has been necessary to use in order that such inks may be properly applied to produce a satisfactory print.

Heretofore, printing inks have in general been made by grinding pigments in oils or oil-varnishes, or both. Such oils or varnishes have absolute viscosities of 5 poises or above at 25° C., measured by the method applied to varnish viscosities (Gardner's Physical and Chemical Examination of Paints, Varnishes, etc., fifth edition 1930, pp. 240, 152, 153) and have been characterized by their relatively slow rate of drying depending upon polymerization, oxidation and/or absorption and, as a consequence, have presented great difficulty in printing processes by greatly delaying the speed of operation. This has not only necessitated the expense and maintenance of large and cumbersome auxiliary equipment and extra labor, but has also resulted in a dependency of the printing process upon the time required to obtain a complete drying.

In order to overcome these difficulties, it has been customary to incorporate in the inks varying amounts of driers which have the ability to accelerate the speed of the oxidation and/or polymerization of the oil varnishes. However, even with all possible acceleration, the drying of the prints takes many hours or even days, necessitating in addition to the great delay in time, extra labor to remove, to store, and to return to the machines the printed material and also in many cases a great waste of paper in the form of slip-sheets which must be rolled up or stacked between the prints in order to avoid offsetting, rubbing off, smudging or sticking together.

It has also been proposed to use various types of lacquers in printing processes, particularly cellulose lacquers. As is well known, the cellulose solvents used in these lacquers are characterized by a high degree of volatility. Indeed this characteristic is considered an advantage in lacquers, for in the ordinary use to which lacquers are put, a rapid drying or hardening is highly desirable. However, it is obvious that such rapid drying renders inks made on this principle unsuitable for printing from plates or rollers; for, while they may be applied to printing plates or rollers, they will quickly dry and harden thereon and they will have only the effect of yielding dry or half dry material to the printing form from which, therefore, no satisfactory impression can be made on the material to be printed.

I have discovered, however, that if in contrast to the above, cellulose compounds, particularly nitrocellulose, are dissolved in solvents with high boiling points, this difficulty may be avoided. Naturally, if the solvents are too slow in evaporating, the same difficulties, which occur in the case of ordinary oil varnish inks, are encountered. In this respect I have found that certain such high boiling solvents, very well adapted to dissolve cellulose compounds, have at room temperature such slow drying properties that, while they may be employed as solvents in this ink and while an excellent impression may be transferred to the surface to be printed upon, the impression will nevertheless be so moist that it is likely to become blurred or smudged by rubbing after many hours or even days. This defect, however, may be remedied by the present invention, which involves a recognition of the principle that some of these high boiling solvents exhibit at temperatures elevated above room temperatures, such a remarkable and quick increase in their vapor pressure that they volatilize rapidly, while at the same temperatures others show little change in their vapor pressures and therefore are practically non-volatile.

By room temperatures, I mean the ordinary temperatures of a room in which technical work is carried on, which is generally accepted to be 20° to 25° C.

As above indicated, the present invention makes use of the characteristics of these solvents having high boiling points and high vapor pressures at elevated temperatures.

The referred to solutions, in contradistinction to lacquer solutions, which require highly volatile solvents, are characterized by their very low rate of evaporation at temperatures approximating room temperature and by their ability to manifest a relatively high degree of volatility when subjected to temperatures higher than room temperature. The solvents or solvent mixtures utilized in the formation of these solutions may be described as solvents having a high boiling point combined with a low vapor pressure at room temperature, but yet further characterized by a rapid rise in their vapor pressure curves upon elevation of the temperature—that is, by their property of evaporating quickly from a thin layer, as in a print, when the temperature is sufficiently raised. Among this peculiar class of solvents I have found as an example diethylene glycol monobutyl ether to be a solvent for nitro-

Defendant's Exhibit E.

cellulose and many natural and artificial gums, very well adapted to the purposes of this invention. This solvent at room temperatures remains fluid and moist for a long period of time. When heated to about 100° C. or above, the rate of vaporization is greatly accelerated and, when used in the ink of this invention, produces a print which dries almost instantaneously when subjected to such a heat treatment.

The printing ink above briefly described may be further admixed with varying amounts of another and different class of oils or high boiling solvents possessing a very low vapor pressure over a wide range of temperatures, and characterised in that they are practically non-volatile if exposed to the heat necessary for the process. This admixture acts as a plasticiser and tends to prevent the brittle characteristic of a film consisting of nitrocellulose or gums alone.

The following specific example is illustrative of my invention as applied to the production of a yellow printing ink particularly. The ink may be made up as follows: 100 parts of chrome yellow, 35 parts of nitrocellulose (low viscosity), 55 parts of diethylene glycol monobutyl ether, 10 parts of dibutylphthalate, and 10 parts of blown castor oil.

The above composition may, for example, be prepared by grinding or otherwise dispersing the pigment in a solution of the nitrocellulose in diethylene glycol monobutyl ether. The two other ingredients may be introduced in such order as may be expedient. It will, of course, be recognised that the yellow pigment may be replaced by any suitable pigments or dyestuffs and/or mixtures thereof; that the nitrocellulose may be replaced by other cellulose compounds and/or by natural or synthetic resins. Moreover, the dibutylphthalate may be replaced by any other suitable agent, effective to prevent brittleness in the finished product. Also, the blown castor oil which has been included in the specific formula given may be replaced by other suitable materials. It may be desirable in some circumstances to omit the last two types of ingredients referred to in the illustrative formula, namely, those which have been added in order to offset extreme hardness and brittleness.

Diethylene glycol monobutyl ether is a practically odorless, saturated, aliphatic or open-chain chemical compound of carbon, hydrogen and oxygen.

The diethylene glycol monobutyl ether may be replaced by other solvents or solvent mixtures possessing a similar low rate of evaporation at ordinary temperatures and a marked acceleration of volatility at raised temperatures. These important properties of diethylene glycol monobutyl ether, the preponderant solvent constituting the major part of the liquid component of the ink in the example given, may, for comparative purposes, be indicated numerically in terms of its vapor pressure at different temperatures which, as determined by Brewer and Gardner in "Industrial and Engineering Chemistry", vol. 29, No. 2, p. 179, February, 1937, are as follows:

	Mm. of mercury
At 20° C.	0.02
At 100° C.	6.4
At 150° C.	about 60.0

These vapor pressures indicate that, at elevated temperatures, this solvent becomes a highly volatile liquid like such highly volatile liquids as, for example, ethyl alcohol which has a vapor pressure of about 40 mm. at ordinary room temperature. The vapor pressures of my preponderant solvent at elevated temperatures contrast sharply with those of the high boiling solvents ordinarily termed "plasticizers" such as dibutyl phthalate, a minor proportion of which is used in the specific formula given. The vapor pressure of this liquid, according to Brewer and Gardner, is 0.45 mm. at 100° C. and 1.4 mm. at 150° C. The vapor pressures of diethylene glycol monobutyl ether indicate that this solvent will evaporate almost instantaneously at elevated temperatures like ethyl alcohol at ordinary temperatures, while such high boiling solvents or plasticizers as dibutyl phthalate evaporate only slowly when heated to temperatures of 100° C. or 150° C.

With ink prepared as above, the printing operation may be carried out in the ordinary manner and at ordinary temperatures. At the conclusion of the printing operation, the printed materials may be subjected, in known manner, to sufficient heat to dry the thin film of the print very rapidly. Thus a finished print is obtained immediately at the end of the printing and heating operation and no time, labor, nor material is wasted in delays incident to the prolonged drying of the printed goods under the processes at present in use. This method of printing is not claimed herein as it forms the subject matter of my co-pending application, Serial No. 15,944, filed April 12, 1935, which is in part a continuation of this application.

The novel ink and process described above are not only capable of utilization in printing upon paper, but they are also adapted for use in making very satisfactory prints upon many other surfaces, such as for instance textiles or metallic surfaces, or the lacquered surfaces of Cellophane, or the like, where the production of a satisfactory print has heretofore been much restricted.

It is apparent that such an ink as has been described does not necessitate the admixture of driers, does not set or harden on the printing rollers or plates, but is yet capable of being dried very quickly when subjected to suitable temperatures after being printed, by the evaporation of the solvent from the thin layer of the print. The finished products are flexible prints in which the pigment is well protected against being rubbed off. They are not softened by moisture, grease, or chemical influences and possess practically no odor. The ink adheres securely to almost every type of surface.

What I claim is:

1. A printing ink which is substantially non-drying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink—the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, and the major part of the liquid component being a chemical compound containing carbon, hydrogen and oxygen which dissolves and forms a stable solution with the solid component and which has a vapor pressure which, at 20° C., is as low as the vapor pressure of diethylene glycol monobutyl ether at 20° C., and, at 150° C., approximates that of ethyl alcohol at ordinary temperatures.

2. A printing ink which is substantially non-drying at ordinary temperatures and dries in-

Defendant's Exhibit E.

stantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink—the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, and substantially 73% of the liquid component being a chemical compound containing carbon, hydrogen and oxygen, which dissolves and forms a stable solution with the solid component and which has a vapor pressure which, at 20° C., is as low as the vapor pressure of diethylene glycol monobutyl ether at 20° C., and, at 150° C., approximates that of ethyl alcohol at ordinary temperatures.

3. A printing ink which is substantially non-drying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component completely dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink—the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, substantially all of the liquid component having a vapor pressure at 20° C. as low as that of diethylene glycol monobutyl ether at 20° C., and the major part of the liquid component having a vapor pressure which at 150° C. approximates that of ethyl alcohol at ordinary temperatures and forming a stable solution with the solid component.

4. A printing ink which is substantially non-drying at ordinary temperatures and dries rapidly at 150° C. consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component—being a member of the group consisting of natural and synthetic resins and cellulose compounds—dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink, in which the major part of the liquid component is an ether including one butyl radical and one diethylene glycol radical and having a vapor pressure which at 20° C. is as low as the vapor pressure of diethylene glycol monobutyl ether at 20° C., and at 150° C. approximates that of ethyl alcohol.

5. A printing ink which is substantially non-drying at ordinary temperatures and dries rapidly at 150° C., consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component—being a member of the group consisting of natural and synthetic resins and cellulose compounds—dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink, in which the major part of the liquid component is monobutyl ether of diethylene glycol.

6. A printing ink which is substantially non-drying at ordinary temperatures and which dries rapidly at 150° C. consisting of a coloring matter dispersed in a viscous fluid vehicle consisting of a liquid component the major portion of which is an organic solvent forming stable solutions with both nitrocellulose and resin having a vapor pressure which at 20° C. is as low as the vapor pressure of diethylene glycol monobutyl ether at 20° C., and at 150° C. approximates that of ethyl alcohol, and a solid component completely dissolved in the liquid component in an amount at least 47% of the amount of said liquid component, said solid component being a member of the group consisting of natural and synthetic resins and low viscosity cellulose esters.

7. A printing ink which is substantially non-drying at ordinary temperatures and which dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component dissolved in a liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink—the solid component being a cellulose compound, and the major part of the liquid component being a chemical compound which dissolves and forms a stable solution with the solid component and which has a vapor pressure which at 20° C. is as low as the vapor pressure of diethylene glycol monobutyl ether at 20° C. and at 150° C. approximates that of ethyl alcohol at ordinary temperatures.

8. A printing ink which is substantially non-drying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink—the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, and the major part of the liquid component being an aliphatic chemical compound containing carbon, hydrogen and oxygen which dissolves and forms a stable solution with the solid component and which has a vapor pressure which, at 20° C., is as low as the vapor pressure of diethylene glycol monobutyl ether at 20° C. and at 150° C. approximates that of ethyl alcohol at ordinary temperatures.

9. A printing ink which is substantially non-drying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink—the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, and the major part of the liquid component being a saturated chemical compound containing carbon, hydrogen and oxygen which dissolves and forms a stable solution with the solid component and which has a vapor pressure which, at 20° C., is as low as the vapor pressure of diethylene glycol monobutyl ether at 20° C. and at 150° C. approximates that of ethyl alcohol at ordinary temperatures.

10. A printing ink which is substantially non-drying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component completely dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink—the solid component being a member of the group consisting of natural and

vapor pressure at 20° C. as low as the vapor pressure of diethylene glycol monobutyl ether at 20° C., and the major part of the liquid component having an open-chain structure and a vapor pressure which at 150° C. approximates that of ethyl alcohol at ordinary temperatures and forming a stable solution with the solid component.

11. A printing ink which is substantially non-drying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component completely dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink—the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, substantially all of the liquid component having a vapor pressure at 20° C. as low as the vapor pressure of diethylene glycol monobutyl ether at 20° C., and the major part of the liquid component having a vapor pressure which at 150° C. approximates that of ethyl alcohol at ordinary temperatures and being a saturated compound forming a stable solution with the solid component.

12. A printing ink adapted for use on paper, comprising a coloring material in a vehicle containing essentially a binder for the coloring material and a solvent for the binder, said binder forming a stable solution in said solvent and being present in amount sufficient to give the ink the consistency of ordinary oil-varnish printing inks, and to protect the coloring material against being rubbed off when the ink is applied by an ordinary printing press, and substantially all of said solvent having a vapor pressure at 20° C. as low as that of diethylene glycol monobutyl ether at 20° C., and developing such a marked increase in vapor pressure at elevated temperatures of 100° C. or above, to which printed paper can be subjected, that its vapor pressure at 150° C. approximates that of ethyl alcohol at ordinary temperatures and that it practically immediately evaporates from a thin film of ink at such temperatures, whereby said ink is stable on the printing press and capable of being immediately dried upon the application of heat following the printing operation.

13. A printing ink consisting of pigment dispersed in an organic viscous vehicle, consisting of a liquid component and a solid component—the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, and being dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink, and to bind the pigment to paper when the ink is applied by an ordinary printing press, and substantially all of the liquid component having a vapor pressure at 20° C. which is as low as the vapor pressure of diethylene glycol monobutyl ether at 20° C., and the major part of the liquid component having a vapor pressure which at 150° C. approximates that of ethyl alcohol at ordinary temperatures and forming a stable solution with the solid component.

14. A printing ink comprising a coloring material in a vehicle consisting of a solid component, composed principally of a binder of the group consisting of natural and synthetic resins and cellulose esters, and a liquid component, composed principally of volatilizable solvent for the binder, said binder being present in amount approximately one-half to two-thirds of said liquid component, by weight, and said solvent having a vapor pressure at 20° C. as low as that of diethylene glycol monobutyl ether at room temperatures of 20° C., and having a vapor pressure at 150° C. equivalent to that of ethyl alcohol at room temperature.

15. A printing ink having a consistency suitable for ordinary printing and comprising a coloring material and a vehicle therefor including a liquid component and a solid component, said solid component being principally a binder for said coloring material, and said liquid component consisting essentially of a minor proportion of an agent adapted to prevent brittleness of the binder and a major proportion of a volatilizable solvent having vapor pressure at 20° C. as low as that of diethylene glycol monobutyl ether at room temperatures of 20° C., and a vapor pressure at elevated temperature of 150° C. equivalent to that of ethyl alcohol at ordinary room temperature.

ALBERT E. GESSLER.

Defendant's Exhibit E.

1932

CONTENTS.

	Application	papers.	
1.			
2.			
3.		SEP 13 1933	
4.		JUN 4 1934	
5.			
6.		JUN 5 1934	
7.			
8.		Nov. 27/34	
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			
21.			
22.			
23.			
24.			
25.			

26.	Renewal petition	
27.	Amdt J	
28.	Amdt K	
29.	Final Rejection	JUN 28 1936
30.	Sup. Pet.	Sep 8. 2/36
31.	Letter	
32.	Affs	Dec. 15/36.
33.	Amdt L	Mar 2-37
34.		
35.		
36.		
37.		
38.		
39.		
40.		
41.		
42.		
43.		
44.		
45.		
46.		
47.		
48.		
49.		
50.		

Defendant's Exhibit F.

Plaintiff's Answers to Defendant's Interrogatories.

To the following interrogatories propounded by defendant under Rules 33 and 34 of the Rules of Civil Procedure, plaintiff makes verified answer by its duly qualified officer, as follows:

1. As to the "printing ink" described in Gessler patent No. 2,087,190, in suit, state as follows:

(a) Has the ink described in said patent been commercially sold by plaintiff, its predecessor, its subsidiary, predecessor of its subsidiary, its or their agent or licensee?

Answer: Yes.

(b) If the answer to Interrogatory 1-a is "Yes", has the ink so sold contained the diethylene glycol monobutyl named in the patent in suit as a solvent for solids of the group consisting of natural and synthetic resins and cellulose compounds?

Answer: Yes.

(c) If the answer to Interrogatory 1-b is "Yes", give (1) the approximate date when plaintiff, its predecessor, its subsidiary, predecessor of its subsidiary, its or their agent or licensee, first sold or offered for sale printing ink containing the diethylene glycol monobutyl ether named in the patent in suit as such solvent, and (2) the name and address of the manufacturer or producer from whom the said diethylene glycol monobutyl ether was obtained.

Answer: (1) April, 1933.

(2) Carbide and Carbon Chemicals Corporation, New York, N. Y.

(d) If the answer to Interrogatory 1-b is "Yes", give the period of sale by plaintiff, its predecessor, its subsidiary, predecessor of its subsidiary, its or their agent or licensee,

of printing ink containing the diethylene glycol monobutyl ether named in the patent in suit as such solvent?

Answer: From 1933 to date, but the sales since 1936 have been small.

(e) Has printing ink sold by plaintiff, its predecessor, its subsidiary, predecessor of its subsidiary, its or their agent or licensee, and claimed by plaintiff to be covered by the patent in suit, contained a substitute solvent for solids of the group consisting of natural and synthetic resins and cellulose compounds, in lieu of the diethylene glycol monobutyl ether named in the patent in suit?

Answer: Yes. In some of the printing inks sold, equivalents have been substituted for the specific illustrative solvent named in the patent.

(f) If the answer to Interrogatory 1-e is "Yes", give the name of each such substitute solvent used in lieu of the diethylene glycol monobutyl ether named in the patent in suit, and (2) the name and address of the manufacturer or producer from whom each such solvent was obtained.

Answer: The equivalent solvents which have been used in place of diethylene glycol monobuty ether (butyl carbitol) are diethylene glycol monobutyl ether acetate (butyl carbitol acetate), purchased from Carbide and Carbon Chemicals Corporation, and high-boiling petroleum fractions, first purchased from American Mineral Spirits Co. and later from other oil companies.

(g) If the answer to Interrogatory 1-e is "Yes", give the date when plaintiff, its predecessor, its subsidiary, predecessor of its subsidiary, its or their agent or licensee, first sold printing ink containing a substitute solvent in lieu of the diethylene glycol monobutyl ether named in the patent in suit.

Answer: Ink containing butyl carbitol acetate as the solvent was first sold by plaintiff's predecessor in February of 1934.

Defendant's Exhibit F.

Ink containing a high-boiling petroleum fraction as the solvent was first sold by plaintiff in July of 1935.

(h) If the answer to Interrogatory 1-e is "Yes", give the period of sale by plaintiff, its predecessor, its subsidiary, predecessor of its subsidiary, its or their agent or licensee, of printing ink containing a substitute solvent in lieu of the diethylene glycol monobutyl ether named in the patent in suit. If more than one such substitute solvent was used, give the answer to this Interrogatory 1-h as to each such substitute solvent, identifying the solvent by name in each case.

Answer: Inks containing butyl carbitol acetate: from 1934 to date.

Inks containing high-boiling petroleum fractions: from 1935 to date.

(i) If the answer to Interrogatory 1-e is "Yes", state the reason for the use in the printing ink sold by plaintiff, its predecessor, its subsidiary, predecessor of its subsidiary, or its or their agent or licensee, of the substitute solvent named in answer to Interrogatory 1-f in lieu of the diethylene glycol monobutyl ether named in the patent in suit. If more than one such solvent was used, give the answer to this Interrogatory 1-i as to each such substitute solvent, identifying the solvent by name in each case.

Answer: Butyl carbitol acetate was used because it is an equivalent of diethylene glycol monobutyl ether (butyl carbitol) which has less effect on rollers composed of glue and glycerin which were used by some printers than does the specific illustrative solvent named in the patent in suit. High-boiling petroleum fractions equivalent to diethylene glycol monobutyl ether (butyl carbitol) were used because they are cheaper than the specific illustrative solvent named in the patent in suit.

(j) If the answer to Interrogatory 1-e is "Yes", state the vapor pressure of each substitute solvent named in the

answer to Interrogatory 1-f as used in lieu of diethylene glycol monobutyl ether named in the patent in suit at 20° C. and at 100° C. and at 150° C.

Answer: The vapor pressure of butyl carbitol acetate is about the same as that of diethylene glycol monobutyl ether (butyl carbitol) at 20° C. and is slightly less than that of diethylene glycol monobutyl ether (butyl carbitol) at the other two temperatures named.

The high-boiling petroleum fractions used have vapor pressures ranging from that of diethylene glycol monobutyl ether (butyl carbitol) to somewhat lower than that of diethylene glycol monobutyl ether (butyl carbitol) at the temperatures mentioned.

2. Submit to defendant's attorneys a one-pound sample of printing ink commercially manufactured for sale by plaintiff, its subsidiary, agent or licensee, which plaintiff claims to be covered by the patent in suit. If different inks are so commercially manufactured, i. e., in the respect that each contains a different solvent than another (regardless of color), submit one-pound samples of such different inks and identify each such sample with the said solvent it contains. Submit also a sample of the solvent contained in each ink sample and state the classes of ingredients in said inks with proportions.

Answer: Plaintiff has submitted to defendant's attorney three one-pound samples of its commercial printing inks containing different solvents and has identified these samples as containing, respectively, butyl carbitol, butyl carbitol acetate and a high-boiling petroleum fraction. Plaintiff has also furnished to defendant's attorney samples of the three solvents contained in the three ink samples. The composition of the ink samples submitted is as follows:

Defendant's Exhibit F.

Ink No. 1

Pigments	59.3%	
Vehicle	40.7%	
	100. %	
Vehicle		
Solvent (Butyl Carbitol)		75.5%
Resin (Nitrocellulose)		24.5%
		100. %

Ink No. 2

Pigments	42.5%	
Vehicle	57.5%	
	100. %	
Vehicle		
Solvent (Butyl Carbitol Acetate)		49.9%
Resins		47.5%
Other Ingredients:		
Solid		0.7%
Liquid		1.9%
		100. %

Ink No. 3

Pigments	29.3%	
Vehicle	70.7%	
	100. %	
Vehicle		
Solvent (High-boiling petroleum fraction)		42.2%
Resins		28.0%
Other ingredients:		
Solid		1.8%
Liquid		28.0%
		100. %

Defendant's Exhibit F.

The "other ingredients" referred to above include wax, drying oil, wetting agents, etc.

3. Give the date when and place (including name and address of establishment) where printing ink that plaintiff claims to be covered by the patent in suit was first used in a printing press for printing on (a) paper, (b) textiles, (c) lacquered surfaces of cellophane, as stated in the patent in suit.

Answer: The ink described in the patent in suit was first used in a printing press for printing on paper at the plant of the Paterson Parchment Paper Company in Passaic, New Jersey, on May 10, 1932.

In so far as plaintiff is informed, the ink has not been used commercially for printing on textiles or "cellophane".

4. If printing ink containing the diethylene glycol monobutyl ether named in the patent in suit as a solvent has been sold since 1936, by plaintiff, its predecessor, its subsidiary, predecessor of its subsidiary, its or their agent or licensee, state (a) the names and addresses of the purchasers thereof, and (b) whether or not in use such ink was dried or set by heat applied to the paper after printing by each of said purchasers.

Answer: (a) Kalamazoo Vegetable Parchment Company, Parchment, Michigan.

(b) Yes, it was so dried.

5. State whether plaintiff, its predecessor, subsidiary, licensee, or agent has given notice to the public of the patent in suit by marking with the patent number under R. S. Section 4900 any inks marketed by it.

Answer: No.

INTERCHEMICAL CORPORATION

By DU VAL R. GOLDTHWAITE

Defendant's Exhibit F

STATE OF NEW YORK }
COUNTY OF NEW YORK } ss.:

DU VAL R. GOLDTHWAITE, being duly sworn, deposes and says:

That he is Chairman of the Board of Directors of Interchemical Corporation, a corporate plaintiff herein; that he subscribed the foregoing answers to defendant's interrogatories on behalf of said corporate plaintiff; that he has read the answers and knows the contents thereof, and that the same are true and accurate.

DU VAL R. GOLDTHWAITE

Sworn to and subscribed before me }
this 10th day of December, 1942. }

FANNIE D. SMUL
Notary Public
Notary Public, Queens County
Queens County Clerk's number 3969
Queens County Register's number 4401
Certificate filed in
New York County Clerk's number 2184
New York County Register's number 4-S-1207
Commission expires March 30, 1944

(SEAL)

Defendant's Exhibit G.

Book of Patents and Publications.

(Opposite ☞)

UNITED STATES PATENT OFFICE.

MARSHALL C. LEFFERTS, OF NEW YORK, N. Y., AND JOHN H. STEVENS, OF NEWARK, NEW JERSEY.

INK.

SPECIFICATION forming part of Letters Patent No. 380,654, dated April 3, 1888.

Application filed December 6, 1886. Serial No. 220,921. (No specimens.)

To all whom it may concern:

Be it known that we, MARSHALL C. LEFFERTS, of the city of New York, in the county of New York and State of New York, and JOHN H. STEVENS, of the city of Newark, in the county of Essex and State of New Jersey, citizens of the United States, have invented certain new and useful Improvements in Inks, of which the following is a specification.

Our invention relates to an improved ink for use in the process of printing upon celluloid and other solid pyroxyline compounds. As this material is of a hard, solid, and nonporous nature, ordinary printing-ink is unfit for this purpose, it not being absorbed as in the case of paper and other material, and when applied to the surface of pyroxyline compounds may be easily defaced or entirely rubbed off.

Heretofore inks that have been used for printing or decorating the surface of celluloid or analogous compounds have contained an ingredient which acted as a solvent of both the pyroxyline and the coloring material. It has been the practice to employ analine colors which have been dissolved in a liquid or mixture which is a solvent of both the analine colors and the pyroxyline compound, and such mixture has been applied to the surface by a brush or pencil or with type. One objection to this ink is that that portion of the color which remains on the surface of the material on becoming dried is easily and readily rubbed or wiped from the surface, leaving an imperfect and indistinct impression.

The object of our invention is to overcome this objection, and, further, to produce an ink in which an insoluble pigment in powdered form may be used, as in ordinary printing-inks; and with these ends in view our invention consists, first, in the employment of a gum in an ink for use in printing upon pyroxyline compounds; secondly, in the use of an insoluble pigment and a solvent of pyroxyline in an ink for use in printing upon pyroxyline compounds; and, thirdly, in an ink containing an insoluble pigment, a solvent of pyroxyline, and a gum or binding agent for holding the particles of pigments together, which ink when applied to a surface of celluloid or other pyroxyline compound effectually attaches itself in and to the surface.

The ingredients entering into the compound are: First, a solvent or a mixture which is a solvent of pyroxyline; second, a pigment or coloring material in powdered form; third, a gum, gums, or binding agent for holding the particles of pigment together.

In describing our invention, we will first state the functions or action of the ingredients entering into the compound, and under each respective head name some of the substances which may be used.

Pigment or coloring matter.—In the first place it is necessary that there shall be a coloring-matter, the function of which is similar to that used in ordinary printing-inks—viz., to impart to the surface printed upon the desired color or tint. For this purpose any suitable pigment may be used, such as is commonly employed in compounding ordinary printing-inks, and which is insoluble in the liquid menstrua employed.

Binder.—The function or office of the binder is to hold, bind, or retain the fine particles of pigment or coloring material together in order that the particles of pigment which are fastened in the surface of the material will not separate from those remaining on the surface, and thus prevent them from being rubbed off. To effect this purpose and produce the best results, the substance used should be soluble in the menstrua or solvent employed that is capable of being dissolved in or combined therewith by the aid of heat or otherwise. The use of this binder is also a great improvement in inks in which the coloring material is soluble. Any gum—such as shellac, rosin, mastic, copal, (preferably the oxidized portion thereof, as copal or kauri dust,) &c., or such gums combined with other material, as pyroxyline—may be used. The kind and proportions of the binding agent used will depend somewhat upon the character of the printing to be done—as, for instance, in inks for use in plate-printing it is preferable to employ gums which will allow the ink to "wipe" smoothly from the polished surface of the plate, as shellac, and in inks to be used for type-printing a more-

adhesive gum, as mastic, rosin, or copal, and in greater proportions, is preferable. We have found that by using a portion of shellac and pyroxyline in inks for use in the former character of printing better results are obtained than by the use of shellac alone. To any one or more of these substances may be added, if desired, camphor, which unites with the binder to form a solid agent for the color, and which from its nature also assists in the solvent action. Castor-oil may also be added to assist in the operation of the gum or gums used as a binder, which further serves to render the ink smooth.

Solvents.—The office or function of the solvent is to penetrate the material and serve as a vehicle for carrying the color and fastening it on or to the surface thereof. With regard to the liquid menstrua which might be used, it is desirable that they be of a low volatility, and either in themselves solvents of the pyroxyline compound or of such a nature that when combined with the other ingredients a mixture which operates as a solvent will be formed—as, for instance, oil of cassia may be used, which in itself is a solvent of both pyroxyline and pyroxyline compounds, or oil of sassafras may be used, which, though in itself not a solvent of pyroxyline, and only under certain conditions a solvent of the compound, yet when combined with the camphor used as an auxiliary binder renders the mixture an effective solvent. By preference we use such substances as oil of cassia, oil of sassafras, nitro-benzole, oil of pennyroyal, oil of fennel seed, oil of cherry-laurel, heavy oil of cinnamon, and oil of hyssop. Some of the lighter solvents may also be used in connection with the above, such as fusel-oil, wood-spirits, grain-alcohol, &c., which not only act as solvents, but also serve to prevent the ink from becoming too thick or adhesive. The tendency of alcohol is also to cut the gum or gums and prevent its settling when slow in dissolving. In selecting the ingredient or ingredients for this purpose care should be taken to employ those substances not likely to cause separation of the ingredients in the compounds. It sometimes happens in mixing an ink for use in plate-printing that the materials have such a tendency after being compounded. In such case the ink may usually be restored to its normal condition by regrinding and at the same time adding a little fusel-oil. Oil of cloves may be employed in an ink for use in plate-printing, and combines readily with the other ingredients, but after having stood a length of time exhibits this tendency to separate. When such substance, or other substances exhibiting a like tendency, is employed, castor-oil and wood-spirits should be omitted and the fusel-oil used in greater proportion. As above stated, it is desirable that the substances used for this office be of a slow drying nature by virtue of which property they will keep the ink in a moist condition for a long time, producing an action somewhat similar to that of linseed-oil used in the preparation of common engraving or printing ink.

Our improved ink, produced as above described, possesses many advantages over those heretofore compounded for use on pyroxyline material, its chief and most important characteristic being that that portion which remains on the surface of the material is capable of being so hardened or baked as to resist a great amount of rubbing without being defaced. In using this ink for printing from engraved plates we prefer to employ heat and pressure, which are applied to the plate and material, the effect being that the ink partially penetrates the surface of the material, while that portion remaining on the surface is baked or hardened, so as to form a hard durable surface. This property of the ink distinguishes it from all other mixtures or inks of which we know.

The proportionate quantities of the ingredients used in compounding the ink will depend somewhat upon the nature or character of the printing to be done and upon whether the ink is to be used in plate printing, type or surface printing.

For plate printing the following proportions may be used with good results:

Pigment.—Any suitable pigment as used in ordinary printing or engraving inks, the amount and color, respectively, depending upon the consistency and color desired.

Gums or binder.—By weight, shellac, four parts; pyroxyline, one-fifth part; camphor, eight parts; castor-oil, two parts.

Solvents.—By weight, oil of cassia, ten parts; fusel-oil, two parts; wood-spirits, two parts.

Heretofore in attempting to color or decorate the surface of pyroxyline compounds inks or dyes have been employed which necessitate the drying of the surface after the application of the color. By means of our improved ink, when used in connection with heat and pressure, as above stated, a hard and permanent impression is produced, and the printed sheets or articles may be piled together immediately after they are taken from the press.

In compounding the ink for use in type-printing, it is especially desirable that the mixture be of a slow-drying nature, as the ink is spread over a large surface, and the entire quantity applied to the type used up, the large surface upon which the ink is spread allowing of permitting of a rapid evaporation of the volatile ingredients, whereas in inks for use in plate printing, though desirable to use slow-drying substances, yet it is not so essential, for the reason that a fresh supply of ink is applied to the plate at each impression taken therefrom, the excess of ink, as is well understood, being wiped off at each operation. It is also desirable that the ink for use in type-printing be of a more adhesive nature to prevent spreading. For this character of printing, the following ingredients may be used with good results:

Pigment.—Any suitable pigment, as used in

ordinary printing or engraving inks, the amount and color, respectively, depending upon the consistency and color desired.

Gums or binder.—By weight, gum mastic or rosin, two parts; camphor, one part.

Solvent.—Oil of cassia, one part.

After the printed article upon which the ink has been used is delivered from the press little or no drying will be found necessary, as the ink is of such nature as to rapidly harden on the material employed.

The compounding of our improved ink is best effected by combining the heavy solvents and binding agents at an elevated temperature, after which the lighter solvents may be added, and the mixture then ground with the pigment in the usual manner for making printing-inks.

The nature and functions of the different ingredients being understood, many equivalent substances or agents which produce similar effects upon pyroxyline compounds and equivalent substances to be used for those referred to as binding agents will suggest themselves to persons skilled in the art, and which may be used with good results, and although we have mentioned only the preferred ingredients we do not intend to limit our invention to those we have specified.

We intend to use any and all known substances or agents which it is possible to use in lieu of those hereinbefore specifically mentioned. In specifying the pigments and solvents and gums, simple and compound, and in describing their use in certain quantities and proportions we have not intended to limit our claim. On the contrary, we are fully aware that other substances and other mixtures and other quantities and proportions than those hereinbefore mentioned may be used with satisfactory results; and we intend that our claims, hereinafter formulated, shall cover and include, broadly, an ink for use in printing upon pyroxyline compounds, in which there shall be used in efficient proportions an insoluble pigment or coloring material, a gum or combination of gums for holding the particles of pigment together, and a solvent or mixture which is a solvent of the pyroxyline compound upon which the ink is to be applied. It is obvious that numerous ingredients may be added—such as camphor, castor-oil, fusel-oil, and other materials—the natures of which are understood, to add to the efficiency of the ink without impairing its value by reason of the presence of the three important constituents of which it is chiefly composed. By the terms "insoluble pigment," as used in our claims, we mean any substance or compound or combination of substances which is insoluble in the menstrua employed. By the term "gum" we mean any gum or combination of gums or substance containing a gum or gums in efficient proportions, and by the term "solvent" we mean any substance or compound or combination of substances which, when the ink is applied to the surface of the pyroxyline compound, will act as a solvent thereof; and by the term "volatile oil," as used in our claims, we mean an essential oil of the nature of those hereinbefore described.

We are aware that certain solvents of nitrocellulose have been employed in the manufacture of celluloid, such solvents being enumerated in several patents granted to one of us—to wit, to John H. Stevens, of Newark, New Jersey, and dated December 19, 1882—but we are not aware that an ink has ever before been made in which a solvent of pyroxyline has been used as a vehicle for the coloring material in a powdered form, or that an ink has ever before been compounded for use upon pyroxyline materials containing the pigment or coloring-matter in a powdered form, or that any ink for this purpose has ever before been compounded in which a binder has been used as an element; and therefore

What we claim as our invention, and desire to secure by Letters Patent, is—

1. An ink for use in printing upon celluloid or other pyroxyline compounds, consisting essentially, of insoluble pigment in powdered form, a solvent of the pyroxyline compound, and a gum for binding the particles of pigment together.

2. An ink for use in printing upon celluloid or other pyroxyline compounds, consisting essentially, of insoluble pigment in powdered form, a gum for holding the particles of pigment together, and a volatile oil which is or becomes a solvent of the pyroxyline compound.

3. An ink for use in printing upon celluloid or other pyroxyline compounds, consisting essentially, of insoluble pigment in powdered form, a gum for holding the particles thereof together, and a solvent consisting essentially, of oil of cassia.

4. An ink for use in printing upon celluloid or other pyroxyline compounds, consisting essentially, of insoluble pigment in powdered form, shellac, and a solvent of the pyroxyline compound.

5. An ink for use in printing upon celluloid or other pyroxyline compounds, consisting essentially, of insoluble pigment in powdered form, shellac, and a solvent consisting essentially, of oil of cassia.

Signed at Newark, in the county of Essex and State of New Jersey, this 29th day of November, A. D. 1886.

MARSHALL C. LEFFERTS
JOHN H. STEVENS.

Witnesses:
ISAAC F. ROE,
ABRAHAM MANNERS.

Patented Dec. 26, 1922. 1,439,696

UNITED STATES PATENT OFFICE.

HOWARD WATERS DOUGHTY, OF AMHERST, MASSACHUSETTS, ASSIGNOR TO ALCHEMIC GOLD COMPANY, INC., A CORPORATION OF NEW YORK.

INK.

No Drawing. Application filed August 14, 1922. Serial No. 581,899.

To all whom it may concern:

Be it known that I, HOWARD WATERS DOUGHTY, a citizen of the United States, residing at Amherst, in the county of Hampshire, State of Massachusetts, have invented certain new and useful Improvements in Inks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to inks and vehicles therefor, and particularly to metallic pigment inks suitable for use in stamping titles and decorative designs on book-bindings and for other purposes to which the ink may be adapted.

In stamping titles in gold, for example, on books, labels and like materials, it has been the practice heretofore to employ gold or imitation gold leaf. The leaf is applied manually after the surface of the material has been treated with size, and the surplus leaf must be removed after stamping. Several operations are thus involved and the application of leaf in the manner described is consequently expensive. The use of artificial leaf effects a saving only in the cost of the leaf. Artificial leaf is, moreover, unsatisfactory because of the inferior quality of the work which quickly tarnishes when exposed to the effect of the atmosphere.

The use of metallic pigment inks has been suggested heretofore as a substitute for metallic leaf in stamping operations. No suitable inks have been available, however, and it has been impossible to produce satisfactory work therewith. A difficulty which has prevented the use of metallic pigment inks is due to vehicles which dry too rapidly on the inking rolls, covering them generally with a gummy coating which prevents transfer of the ink to the type or die. In avoiding this extreme it is necessary to provide an ink which when once applied will dry rapidly.

It is the object of the invention, therefore, to provide an ink and an ink vehicle having the necessary properties, among others comparative slowness in drying without a tendency to become gummy, a consistency permitting transference of the ink through inking rolls to the type or die, rapid drying when applied to the work, and ability to protect the pigment from oxidation and consequent discoloration.

I have discovered that these desirable properties may be imparted to the ink by the use of a suitable medium in the vehicle for the pigment and that such a medium will, moreover, permit rapid drying of the ink by the application of heat to the type or die. The medium should be volatile, i. e., capable of being vaporized without carbonization, but its boiling point should be relatively high to reduce vaporization at atmospheric temperatures, and consequently to prevent rapid drying on the inking rolls. The medium must, moreover, be a solvent for the body of the vehicle. Preferably the boiling point of the selected medium should be between 200° and 300° C., a boiling point lower than 250° C. being desirable. Solvents boiling materially below 200° C. are unsuitable because the ink dries too rapidly on the rolls and becomes gummy. Solvents boiling materially above 300° C. are likewise unsuitable because the ink cannot be successfully dried except by the application of impracticably high temperatures. A suitable medium may be found in the derivatives of the terpene series of hydrocarbon compounds; the alcohols, of which terpineol is an example, being admirably adapted for the purpose. Terpineol is capable of imparting the desired properties to the vehicle in a marked degree, and is at the same time readily available in commerce and relatively inexpensive. Other suitable solvents are benzyl alcohol and certain esters of aromatic acids such as terpinyl acetate, benzyl acetate and ethyl benzoate. Oil of dammar resin is also a suitable solvent, this and the other solvents mentioned having the distinguishing characteristics above referred to.

In carrying out the invention the solvent is combined with a thickening agent forming the body of the vehicle. Preferably a resinous material such as colophony (ordinary rosin), dammar, copal, Bergundy pitch or Canada balsam, or a synthetic resin, i. e., a phenol condensation product, is dissolved in the solvent to produce a vehicle of the desired consistency. A proportion of benzoin may be added with advantage to the composition, replacing a portion of the other resinous material, or benzoin may be substituted for either of the resins mentioned, which, of course, may be mixed or combined in any desired proportions, although for commercial reasons it is preferred to employ colophony

alone as a resinous ingredient of the composition. The pigment, preferably a bronze or other metallic powder of the desired color, is thoroughly incorporated with the vehicle to complete the ink.

It is to be understood that equivalents of the terpineol, benzyl alcohol or other solvent may be substituted therefor and that materials naturally containing these solvents may be employed. Artificial mixtures containing the solvents mentioned may be used also. Natural or artificial mixtures of the solvent should have a minimum boiling point of substantially 200° C. to avoid too rapid drying of the ink upon the rolls.

I have also discovered that certain higher boiling liquid saturated paraffin hydrocarbons, e. g., those present in fractions of kerosene boiling above 250° C. at normal pressure may be employed instead of terpineol. These higher boiling fractions are mixtures of hydrocarbons, and, while not so desirable as terpineol, they nevertheless are capable of producing a satisfactory ink when used as a solvent for the resin. The paraffin compounds referred to may be combined with terpineol and terpineol-containing mixtures also with successful results.

The bronze or other metallic powder used may be the ordinary article of commerce and may consist, for example, of an alloy of copper with other metal or metals adapted to impart the desired color to the alloy. The alloy is reduced to a state of fine sub-division in the usual manner. Metallic powders containing metals other than copper can be used.

As an example of the application of the invention, the vehicle may comprise four parts of the solvent, terpineol or benzyl alcohol for example, to one part of ordinary rosin. Preferably the solvent is heated to a temperature ranging from 100° to 130° C. and is maintained at that temperature while the rosin is dissolved therein. The proportions of resin and solvent may be varied within the limits necessary to produce a vehicle of the proper viscosity. The vehicle and metallic powder are thoroughly mixed preferably in the proportions of two parts of the powder to one part of the vehicle.

The ink produced as described may be applied by means of the usual ink fountain or table to the inking rollers and thence transferred to the type or die. Drying of the ink on the rollers, a fault which has characterized inks heretofore suggested, is avoided. The ink dries very slowly at atmospheric temperature owing to the high boiling point of the volatile solvent. It dries rapidly, however, when applied with a heated die. The impression is highly glossed and the vehicle forms a lacquer which protects the pigment from tarnishing, thus providing a permanent and highly satisfactory title or decoration on book bindings and the like. The color will depend upon the particular pigment employed which may be other than metallic in character.

The ink described, though particularly suitable for book-binders' use, will serve other purposes of decorative printing. It is adapted to materially reduce the cost of such printing because of the low cost of the ink and the simplicity of its application.

Various changes may be made in the details of the invention without departing therefrom or sacrificing any of the advantages thereof.

I claim:—

1. An ink having a metallic pigment and a vehicle comprising a resinous substance and terpineol as a solvent therefor.

2. An ink having a metallic pigment and a vehicle comprising a resinous substance and a mixture of terpineol with other solvents for the resinous substance.

3. An ink having a metallic pigment and a vehicle comprising a resinous substance and a solvent containing terpineol.

4. An ink having a metallic pigment and a vehicle comprising a solvent containing terpineol and a thickening agent dissolved therein.

5. An ink having a metallic pigment and a vehicle comprising ordinary rosin dissolved in a solvent containing terpineol.

6. An ink having a metallic pigment and a vehicle comprising ordinary rosin dissolved in terpineol.

7. In an ink a vehicle comprising a solvent containing terpineol and a thickening agent dissolved therein.

8. In an ink a vehicle comprising terpineol and a thickening agent dissolved therein.

9. In an ink a vehicle comprising a resinous material and a solvent therefor containing terpineol.

10. In an ink a vehicle comprising ordinary rosin and a solvent therefor containing terpineol.

11. In an ink a vehicle comprising ordinary rosin and terpineol as a solvent therefor.

In testimony whereof I affix my signature.

HOWARD WATERS DOUGHTY.

Patented Apr. 3, 1923. 1,450,692

UNITED STATES PATENT OFFICE.

WILLIAM J. McELROY, OF NEW YORK, AND JOHN CLARKE, OF MANHASSET, NORTH HEMPSTEAD, NEW YORK, ASSIGNORS, BY MESNE ASSIGNMENTS, TO ALCHEMIC GOLD COMPANY, INC., A CORPORATION OF NEW YORK.

PRINTING INK.

No Drawing. Application filed June 16, 1922. Serial No. 568,849.

To all whom it may concern:

Be it known that we, WILLIAM J. McELROY, a citizen of the United States, and a resident of the borough of Manhattan, city, county, and State of New York, and JOHN CLARKE, a citizen of the United States, and a resident of the village of Manhasset, town of North Hempstead, county of Nassau, and State of New York, have invented a new and useful Improvement in Printing Inks, of which the following is a description, as well as of the manner and process of making, constructing, compounding, and using the same, in such full, clear, concise, and exact terms as to enable any person skilled in the art or science to which it appertains or with which it is most nearly connected to make, construct, compound, and use the same.

Our invention relates generally to printing inks and particularly to those having metallic powders as their pigments.

The objects of our invention are the production of improved printing inks adapted for general use and more especially for use in embossing and die-printing upon bookcloth, leather and other materials commonly used for book casings; particular objects are the production of inks of this class which shall be adapted for application by a heated die, plate or other impression member, preheated to embossing temperatures, and which shall be characterized by the qualities of drying immediately under the relatively high temperature preferred in embossing metallic powders; and having properties of strongly adhering to and covering smoothly, evenly and completely the surface upon which they are stamped; of being rendered lustrous by the heat of the metal by which they are impressed upon such object; of permanently retaining their original color and luster without tarnishing or fading; of high boiling point and of low volatility.

Further objects are the provision of an ink with the foregoing qualities which can be mixed ready for use by the manufacturer and which will not corrode or otherwise deteriorate in the container, and which, when packaged, and transported shall remain in its original state with its qualities and both its physical and chemical conditions unimpaired even after long lapse of time.

We have heretofore disclosed in our copending application Serial Number 562,437, filed May 20, 1922, a printing ink attaining the foregoing objects. We have also discovered that an ink composition containing metallic pigments may be produced which will realize the above recited features of advantage by using a non-acid synthetic resin as a binder and protector in lieu of the neutralized rosin typified by an ester of resin as therein claimed.

Our invention consists in the discovery that a coumarone resin has the desired utilities in combination with bronze powders of functioning as a binder to the powders, as an adhesive to the articles stamped, and as a protective coating to the impressed metallic deposit when printed.

The coumarone resins are coal tar condensation products derived from coumarone and indene which are themselves constituents of coal tar naphtha. They are usually yellow in color, and particularly well suited to conjunction with those bronze powders customarily employed as pigments in so-called imitation gold leaf, gold ink and the like compositions, blending therewith without detracting from their pigmentation. While the particular example selected by way of illustration is a gold ink, it is obvious that there are varying shades of bronze powders in the imitation gold powders, and a wide range of metallic pigments known as bronze powders imitating other metals, such as silver and aluminum. These synthetic resins dissolve readily in such energetic solvents as terpineol, pine oil, rosin oil, and the high-boiling mineral oils. Because of its body, which is well adapted to maintain bronze powders in suspension, and its volatility at embossing temperatures, we prefer terpineol as a solvent vehicle for this coumarone binder. As the binder becomes volatile at these temperatures, we preferably admix with the terpineol a small per cent of rosin oil. Since rosin oil at such temperatures is less volatile than terpineol, the mixture preferred as a solvent is approximately 95 per cent of terpineol and five per cent of rosin oil, such minor percentage sufficing to render the binder more plastic when dried, whereby the ink impression is prevented from cracking or scaling off. Rosin oil, because of its low volatility, is not suitable alone as such solvent,

because of the slow drying of the ink impression. Pine oil as a solvent is subject to the like disadvantage imported by terpineol, leaving the impression too brittle. It is not as valuable for the desired purposes because it is commercially variable as a manufactured product, its definite chemical composition not being standardized. If neutral in character, it is suitable as a solvent, but as now produced, it is liable to be acid or to become so when exposed to the air, and react upon the metallic pigments undesirably; otherwise it affords, when mixed with the proper proportions of rosin oil, a suitable non-acid vehicle for the binder.

As an example of the preferred proportions of the ingredients named, we take, by weight, 95 per cent terpineol and 5 per cent rosin oil, and stir until thoroughly mixed.

With 84 per cent of this mixture we incorporate 16 per cent of powdered coumarone resin, e. g., that known under the trade name of "Cumar," and warm this mixture upon a water-bath at 100° centigrade, stirring meanwhile, until the "Cumar" is thoroughly dissolved, which will result in about 20 minutes with vigorous stirring. The batch is then allowed to cool. From this batch we take one-third and add thereto two-thirds of bronze powder, both by weight. This mixture is then stirred until the bronze powder is thoroughly and evenly incorporated. The ink resulting is of pasty and semi-fluid consistency, similar to that of printing inks generally.

As the metallic pigment above intended, we prefer a mixture of bronze powder of the grade known commercially as Hemmerdinger's Special No. 1, with 80 per cent of which is mixed 20 per cent of the finer grade of bronze powders known generally in the trade as "Lining," a more finely comminuted species of such powders.

The proportions above exampled may be varied somewhat without appreciable variation of the product. However, 20 per cent of "Cumar" to 80 per cent of solvent vehicle forms an ink which at certain temperatures tends to clog the impression member. 10 per cent of rosin oil tends under certain temperatures to give a too wet impression, which, until dried, is liable to be too tacky and to smudge. 100 per cent terpineol tends to produce a too brittle impression. The ratio of bronze to vehicle affords more latitude of variation, but an excess of bronze does not work well on the press and clogs the die, the practical limit being about 2½ parts of bronze to one of vehicle.

While thus specifying terpineol and rosin oil as the constituents preferred of our binder solvent vehicle, we wish to be understood as typifying thereby a binder vehicle having the desired properties as such, first, of an active solvent of the synthetic resins named; second, as of the desired body adapted to maintain the bronze powders in sustained suspension; third, as of the requisite degree of volatility to be driven off by the temperature used in embossing metallic pigments to impart the desired luster thereto; fourth, affording that degree of plasticity and elasticity to the impression which will prevent its cracking; fifth, the necessary neutrality which will preserve the metallic particles from corrosion on standing when mixed in ink form; sixth, which shall not cause the impressed characters to tarnish; and seventh, which shall be colorless or of such color as will not detract from the desired metallic luster. Within the limitations imposed by these criteria, the binder vehicle may be any of the solvents named or suitable combinations thereof. This printing composition is primarily intended for printing book covers which, when of cloth, are prepared as cases with a strong coating of glue to hold the cloth to the backing. As the boiling point of the vehicle specified is approximately 428° Fahrenheit, the impression temperature must suffice to drive off the volatile solvent, that the impression may be dry, but must not be so high as to draw the glue through the cloth and thereby cause blisters in the impression or darken it. Preferably, therefore, the described composition should be used as an ink at a temperature substantially that of the boiling point of the solvent vehicle. As will be obvious, however, the ink set forth may be used at lower temperatures, or cold, and the impression artificially dried thereafter.

By virtue of the comparatively high specific gravity of the synthetic resins produced as condensation products of naphtha, and the heavy body of the solvents therefor herein named, the solution obtained affords an especially valuable vehicle for the metallic pigments in that the tendency of the bronze powder to settle is checked and a persistent suspension thereof is attained.

Having thus described the preferred embodiment of our invention and the best method now known to us of producing and usefully applying same, we claim:

1. A printing composition comprising a metallic pigment, a binder therefor consisting of a neutral synthetic resin, and a neutral solvent therefor, the said solvent being volatile at temperatures between 400° and 500° Fahrenheit, and the binder being adapted to constitute a protective coating to the impressed pigment.

2. A printing composition comprising a metallic pigment, a binder therefor consisting of a neutral synthetic resin, a volatile neutral solvent therefor, and an oil less volatile than the solvent adapted to blend with the binder and render it flexible when impressed.

3. A printing composition comprising a metallic pigment, a binder and a high-boiling neutral solvent, the binder consisting of a coumarone resin.

4. A printing composition comprising a metallic pigment, a coumarone resin, and terpineol.

5. A printing composition comprising a metallic pigment, a coumarone resin, terpineol, and rosin oil.

6. A printing composition comprising a metallic pigment, a coumarone resin, and a high-boiling heavy-bodied neutral oil adapted to dissolve said resin.

7. A printing composition comprising a metallic pigment, a synthetic resin, and a high-boiling heavy-bodied neutral solvent of an oily character.

8. A printing composition comprising a metallic pigment, a synthetic resin, and a heavy-bodied neutral solvent.

9. A printing composition comprising a metallic pigment, a synthetic resin and terpineol.

10. A printing composition comprising a metallic pigment, a synthetic resin, terpineol, and rosin oil.

11. A printing composition composed of the recited ingredients in the following proportions by weight: 16 per cent of coumarone resin dissolved in 84 per cent of a solvent composed of 95 per cent terpineol and 5 per cent rosin oil; with metallic powder pigment in the proportion of two parts of pigment to one part of the resin solution.

12. A printing composition comprising the recited ingredients in the following proportions, by weight: 16 per cent of a non-acid synthetic resin dissolved in 84 per cent of a non-acid solvent and metallic pigment in the proportion of two parts of pigment to one part of the solution.

WILLIAM J. McELROY.
JOHN CLARKE.

Patented Apr. 1, 1930 1,752,462

UNITED STATES PATENT OFFICE

WALTER F. SMITH, OF KINGSPORT, TENNESSEE, ASSIGNOR, BY MESNE ASSIGNMENTS, TO KINGSPORT PRESS, INC., A CORPORATION OF DELAWARE

NONTARNISHING METALLIC INK

No Drawing. Application filed November 16, 1927. Serial No. 233,746.

The invention relates to an improvement in the composition of metallic pigment printing inks of the class of such inks which are used for stamping titles and designs on book bindings and the like.

It is a practical requirement in using inks of this character that the vehicles which carry the contained metallic pigments should not dry readily at atmospheric temperature; should dry rapidly when applied to the heated type or dies but should not dry so rapidly as to form gummy coatings thereon, and otherwise it is required that such inks have a readily flowing consistency permitting a smooth and clean transference of the same through the inking rollers to the type or die.

One composition which has been used to meet the peculiar requirements of such inks comprises a metallic pigment, a vehicle therefor including a suitable medium which is a solvent for the body of the vehicle and which evaporates without carbonization and has a boiling point relatively high to reduce vaporization at atmospheric temperature.

Numerous examples of such medium have been suggested, such as the derivatives of the terpene series of hydro-carbon compounds and the alcohols, of which terpineol has been most extensively used. Other suitable solvents are benzyl alcohol and certain esters of aromatic acids, such as terpinyl acetate, benzyl acetate, and ethyl benzoate. The solvent has been combined with a thickening agent forming the body of the vehicle, usually a resinous material, such as colophony (ordinary rosin in a benzyl alcohol solution). This resinous body is dissolved in the medium in various proportions to produce a vehicle of the desired consistency. The metallic pigment, preferably a bronze alloy of copper, or other metallic powder of the desired color, is thoroughly incorporated with the vehicle to complete the ink.

While it is claimed for such known forms of metallic pigment inks, such for example as those containing dissolved rosin and terpineol, that the contained pigment is protected from oxidation and consequent discoloration, and that the vehicle forms a lacquer which protects the pigment from tarnishing, this claim is not confirmed in actual practice. While inks of this character possess the desirable attributes of proper drying reactions and are otherwise satisfactory due to low cost and the like, they have the objection that the inked impressions made therefrom soon become discolored, lose their initial brilliancy and eventually turn black.

Accordingly, the primary object of this invention is to provide a simple form of metallic pigment ink of the character outlined, which will have the desirable properties of the rosin-terpineol type of such inks, and which, at the same time, will feature an ink which when dry will retain its original lustre and be substantially free from tarnishing for a long period of time after it has been applied.

Broadly, this object is attained by adding to the known rosin-terpineol, or equivalent types of metallic pigment ink, a substance capable of forming a protecting coating or lacquer on the metallic particles and which, incidentally, will not have any deleterious effect either on the metal, on its vehicles or on its solvents.

One such substance which has given satisfactory results is nitro-cellulose (pyroxylin) or similar material likewise insoluble in terpineol, dissolved in appropriate solvents such as ethyl acetate, butyl acetate, ethyl alcohol, methyl alcohol, benzol, ether and the like.

In preparing the ink the powdered metal is simply stirred slowly into a solution of nitro-cellulose (pyroxylin) until the metallic particles are completely coated. In one practical instance where a bronze powder was used, the nitro-cellulose (pyroxylin) was present in the proportion of about one part of the pyroxylin to two parts of the metal.

The liquid portion of this lacquer is then driven off in such a way as to leave the coated bronze in powdered form with each small particle covered with a coating of nitro-cellulose. This can be done by ejecting the lacquer through an air jet into a small chamber from which the air is constantly being drawn by a fan through a finely woven silk screen. The metal powder so coated is mixed in the rosin-terpineol, or equivalent vehicle

in the proportion of approximately two parts of the coated powder to one part of the vehicle.

The ink so produced is applied as is usual with the known rosin-terpineol metallic inks, being carried by means of an ink fountain or table to the inking rollers and hence transferred to the heated type or die which reacts to volatilize the solvents present in the liquid composition.

The resulting impression is highly glossed and the presence of the pyroxylin in the vehicle forms a lacquer which protects the pigment from tarnishing, thus providing a permanent and highly satisfactory title or decoration on book bindings and the like, and which protection is not possible with the usual rosin-terpineol types of metallic inks.

Having thus described my invention, I claim:

1. An ink having a metallic pigment coated with nitro-cellulose (pyroxylin) and a vehicle therefor comprising a resinous substance and terpineol as a solvent for the resinous substance.

2. An ink having a metallic pigment coated with nitro-cellulose (pyroxylin) and a vehicle therefor comprising a resinous substance and terpineol mixed with other solvents for the resinous substance.

3. An ink having a metallic pigment coated with nitro-cellulose (pyroxylin) and a vehicle therefor comprising a thickening agent dissolved in a solvent containing terpineol.

4. An ink having a metallic pigment coated with nitro-cellulose (pyroxylin) and a vehicle therefor comprising rosin in a solvent for the rosin containing terpineol.

5. An ink having a metallic pigment coated with nitro-cellulose (pyroxylin) and a vehicle comprising rosin dissolved in terpineol.

6. An ink comprised of rosin, terpineol, a metallic pigment coated with nitro-cellulose (pyroxylin), in which the nitro-cellulose is present in the proportion approximately of one part of nitro-cellulose to two parts of the pigment.

This specification signed this 5th day of November, 1927.

WALTER F. SMITH.

Patented May 26, 1931 1,806,965

UNITED STATES PATENT OFFICE

JOHN H. CLEWELL, OF ARLINGTON, NEW JERSEY, ASSIGNOR TO DU PONT VISCOLOID COMPANY, OF WILMINGTON, DELAWARE, A CORPORATION OF DELAWARE

INK FOR CELLULOSE ESTERS

No Drawing. Application filed April 12, 1928. Serial No. 269,895.

This invention relates to chemical inks, and particularly to ink for marking and printing on cellulose ester bodies, as cellulose ester plastics and films having cellulose nitrate or cellulose acetate as a base. Although not restricted thereto, it finds particularly valuable use in the application of indicia, e. g. footage numbers, to motion picture film, especially in those cases where the indicia are to be applied by an automatic numbering machine.

A major object of the invention is to provide an ink which, when applied, will remain permanent against abrasion and the attack of photographic developing and washing fluids, and will not have a deleterious effect on the sensitized photographic emulsion, either by contact therewith or by emanation from the ink. It is a further object to provide an ink which will dry rapidly on the ester body but yet will print clearly without blurring and will not gum on the type, and which will be at least partially absorbed into the ester body, but, in the case of motion picture film, will not shrink the perforations. To these ends and also to improve generally upon inks of the character indicated, the invention consists in the various matters hereinafter described and claimed.

Without restricting the invention thereto, the following will serve as an example of an ink in accordance with the present invention, such ink having the above indicated and other, desirable characteristics and being usable for cellulose nitrate and cellulose acetate bodies:—

	Grams
Diacetone alcohol	200
National nigrosine base N	20
Orange shellac	80

The above, it will be noted, comprises a solvent for either cellulose nitrate or acetate, e. g. diacetone alcohol, a dye, and a thickener, e. g. shellac. Any good nigrosine base may be substituted for the black one given. Blue ink can be made by the use of any of the spirit blues, and green by the use of malachite green or diamond green. Other suitable gums may be substituted for the shellac. The diacetone alcohol, boiling point about 160° C., represents a good cellulose ester solvent (and dye solvent) which gives sufficiently rapid drying without being too highly volatile. In making up the composition, dissolve the nigrosine in the alcohol, filter, and then add the shellac. The rate of drying can be increased by an addition of methyl acetone and decreased by an addition of triacetine.

It will be evident that the proportions of the ingredients may be considerably varied from those given above. An important feature is the use of a high-boiling solvent which has a strong solvent action on the material to be marked, and at the same time is a good solvent for dyes. The boiling point of the solvent should be high, so that the ink does not dry on the printing tool, but not so high as to retard its drying rate unduly. A boiling point between 140° C. and 225° C. is most suitable, but this range is not essential. When used on the plastic the ink sets quickly, largely by absorption into the plastic. Diacetone alcohol is a solvent which peculiarly meets these requirements. Other solvents which might be used are ethyl lactate, and diethylene glycol.

I claim:

1. Ink for cellulose ester bodies comprising a cellulose ester solvent having a boiling point substantially between 140° C. and 225° C., a nigrosine base soluble therein, and a thickener.

2. Ink for cellulose ester bodies composed of diacetone alcohol, a dye soluble therein, and shellac.

3. Ink for cellulose ester bodies composed of ethyl lactate, a dye soluble therein, and shellac.

4. Ink for cellulose ester bodies composed of diethylene glycol, a dye soluble therein, and shellac.

In testimony whereof, I affix my signature.

JOHN H. CLEWELL.

Patented Oct. 25, 1932 1,884,553

UNITED STATES PATENT OFFICE

THEODORE F. BRADLEY, OF WESTFIELD, NEW JERSEY

COMPOSITION INTENDED FOR COATING, DECORATING, AND PRINTING WOOD, METAL, PAPER, CLOTH, AND OTHER SURFACES

No Drawing. Application filed April 11, 1927. Serial No. 183,011.

This invention relates to nitrocellulose coating compositions and to the process of making same, and particularly relates to compositions suitable for the manufacture of artificial leather, coated fabrics, printing lacquers and various other products where a particularly low volatility is necessary.

It is the object of my invention to provide nitrocellulose coating compositions which shall be almost non-volatile at ordinary room temperature, that, is, at approximately 70° F., and yet which will dry quickly at slightly elevated temperatures, for example, at about 140° F. This is of particular importance where liquids of alleged toxic nature, such as for example, benzol, are employed, and also when improved flowing and working qualities are desirable. Thus, in the manufacture of artificial leather where benzol is often used in admixture with ethyl acetate to form a solvent vehicle for nitrocellulose, various ills have been attributed to the vapors of benzol. One of the features of the present invention comprises a method for reducing, and, in fact, practically eliminating all evaporation of benzol at ordinary room temperatures from nitrocellulose solutions or dopes, although not preventing the evaporation when the temperature is elevated, such as when the coated materials are passed through ovens, equipped with ventilating devices or solvent recovery systems. It is sufficient to minimize evaporation at room temperatures so that the coated fabrics and solutions which the workmen handle, will not produce poisoning.

Another feature of this invention comprises a method of reducing the volatility of nitrocellulose lacquers, so that they may be utilized in the production of printing compositions in place of ordinary printing and lithographing inks. Nitrocellulose solutions as ordinarily made are relatively and progressively quick-drying, and therefore cannot be used successfully for the purposes indicated.

Attempts have been made to secure easy flowing and slow drying lacquers by utilizing as solvents extremely high boiling solvents of low volatility. Such solvents as glycol diacetate, glycol and glycerine ethers and esters, benzyl acetate, and various other cellulose ester solvents of the same range of volatility having been considered. These vehicles are rather costly and furthermore, have the disadvantage of being somewhat too slow drying, even when the materials are oven dried. Under the present invention I effect less expensive and generally more satisfactory results.

This invention comprises nitrocellulose coating compositions which contain a solvent for nitrocellulose easily volatile at ordinary room temperatures, preferably with a diluent of like volatility, together with such a percentage of a wax as will prevent appreciable evaporation of said solvents and yet yield a surface finish substantially free from rings, pock marks, waxy finish, or other such irregularities commonly caused by excess wax. It has been found that waxes such as Japan and carnauba waxes are of but little value in accomplishing the object of this invention, the most satisfactory results having been secured from either paraffin or ceresin wax. Furthermore, definite proportions have been determined, the use of substantially greater amounts than those stipulated tending to reduce the gloss of the coatings and to produce rings, pock marks, waxy surfaces, and various other surface irregularities, while the use of substantially lesser amounts does not satisfactorily check evaporation at room temperatures.

Thus a lacquer composition suitable for printing may be made as follows:

	Parts by weight
Rosin ester	40
Dibutyl phthalate	90
One-half second viscosity nitrocellulose	75
Zinc oxide	140
Butyl acetate	150
Toluol	150
Ethyl alcohol	30
Ceresin wax	2

This printing lacquer does not dry readily at ordinary room temperatures and yet has been found to dry very rapidly when surfaces coated with it are placed in an oven at

about 120° to 140° F. The composition has been found to dry to a flexible and glossy smooth surface. In manufacturing such a composition the wax and resin are dissolved in a portion of the solvent mixture. The nitrocellulose may be dissolved in a separate portion of the same solvent mixture. The pigment may then be ground in the plasticizing agent, or in a mixture of the wax and resin solution and the plasticizing agent. This may be accomplished by means of an ordinary flat stone or roller paint mill. The presence of the wax is valuable in this operation. In some cases the grinding may be accomplished by means of a ball mill. After the pigment has been ground in the manner indicated the various solutions are admixed to give a composition substantially as indicated.

Various other types of resins may be employed such as are commonly used in nitrocellulose compositions, including all of the usual natural resins, as well as such synthetic resins as benzoic phthalic glyceride resin, rosin phthalic glyceride resin, Congo rosin phthalic glyceride resin, castor oil phthalic glyceride resin, and also a special type of resins produced from cottonseed oil fatty acids, phthalic anhydride and glycerol. In some cases, all resin may be omitted. Various other types of plasticizing agents may be employed, or mixtures thereof, among which are castor and rapeseed oils, dibutyl and diethyl phthalate, tricresyl phosphate, camphor, and other nitrocellulose softening or plasticizing agents. Any of the usual pigments may be likewise employed, according to the general character of the coating desired.

Various solvents may be employed in the production of the new type coating compositions. All of the usual nitrocellulose solvents of a low or medium volatility may be employed, it merely being necessary that said solvents, or mixtures thereof, have sufficient solvent action on the wax to maintain the same substantially in solution; sufficient to function in the manner aforesaid. Thus, either ethyl, propyl, butyl, amyl and hexyl acetates or propionates may be used, in some cases alone or more preferably in admixture with various alcohols or hydrocarbon diluents of like degree of volatility. Other nitrocellulose solvents such as acetone, ethyl methyl ketone and similar volatile solvents may likewise be employed to produce satisfactory solvent vehicles. The proportion of wax may be altered slightly, according to the solvent mixtures employed, although it is in all cases necessary that sufficient wax be used to render satisfactorily slow drying at room temperatures, while avoiding the use of such excessive amounts as will disrupt the surface finish. This will vary slightly according to the solvent mixtures employed and also according to such variations in room temperature as may obtain. In general, it is not advisable to employ substantially over 2 per cent (on the weight of the solvents employed) of paraffin or ceresin wax, much larger amounts having been found to produce defective surface finishes. Nor is it advisable to use much less than ½ of 1 per cent of said waxes. Less wax can be used in cold weather to good advantage in some cases. The use of alcohols have been found of some value in reducing the viscosity of the nitrocellulose solutions, and this is of particular value in the production of printing lacquers. Replacement of 100 parts of toluol with a like amount of butyl alcohol, for example, gives lowered viscosity. The wax content then may be 1½ instead of 2 parts.

The reduction in viscosity due to the addition of a substantial proportion of alcohol is valuable in the production of nitrocellulose printing inks. By such reduction in viscosity adhesion of the type to the paper is considerably reduced. On the other hand, the presence of a high proportion of alcohol tends to throw the wax out of solution and therefore it is best to reduce the content of the wax, keeping in mind that any precipitated wax is likely to affect the gloss or appearance of the surface. Avoidance of wax markings on the surface may be attained by proportioning the solvents with respect to the wax, so that the varnish or lacquer on drying does not expel wax from the coating in such a manner as to yield a disfigured surface. It will be noted in the illustrative formula that I have shown a proportion of 2 parts of wax to 75 parts of nitrocellulose. As a general rule, I aim to have the content of wax very much less in proportion than that of the nitrocellulose. In this manner, furthermore, wax markings are minimized.

The hydrocarbon such as benzol, toluol, solvent naphtha, and the like, serves as a solvent for the wax, although acting as a precipitant for the nitrocellulose. On the other hand, the nitrocellulose solvents, as a rule, are poor solvents for wax. Therefore, to proportion a composition having the requisite solubility for nitrocelullose and for wax and containing a minimum amount of wax consistent with the substantial hindering of evaporation of the wax at room temperature, calls for a consideration of the principles set forth in the present specification.

It has been proposed to employ wax in paint and varnish removing compositions to retard evaporation, but in such compositions the proportion of wax is not confined to very narrow limits. Whereas, in my composition a definite limitation is placed on the wax content to avoid surface defacement. In my composition the wax preferably is maintained almost entirely in solution or dispersion

through the aid of the nitrocellulose functioning as a protective colloid. Furthermore, the present application relates to compositions which are intended for coating purposes, that is, to cover over or ornament a surface, or to produce printed impressions, and the like, whereas the aforesaid paint and varnish removers are intended for the removal of coatings. In other words, my composition is intended for a totally different purpose than paint and varnish remover and is, moreover, prepared with respect to considerations of a character totally different from those obtaining in meeting the requirements of paint and varnish removers.

My invention therefore comprises a composition adapted for coating surfaces such as the production of artificial leather, or for printing surfaces of paper, leather, and the like, and for other similar operations where a flexible surfacing is to be applied, such composition comprising nitrocellulose or cellulose acetate or other analogous soluble cellulose material dissolved in a volatile solvent, sometimes unitary, but preferably a composite one, preferably composed of a mixture of nitrocellulose solvents and wax solvents and containing a proportion of wax very slight with respect to the total amount of the composition, but sufficient to substantially prevent evaporation, at say, 70° F., while not materially preventing evaporation at temperatures somewhat above 100° F.

To secure a maximum degree of wax-dispersing effect with a minimum of wax-expulsion with the object of eliminating surface defacement by the wax, I preferably employ low viscosity nitrocellulose such as the one-half second and four second material have a desirable cooperating action with the mineral wax or other wax employed. With such low viscosity nitrocelluloses I may use a more effective concentration of wax and still keep the proportion of wax below a surface-defacing concentration. Employment of low viscosity nitrocellulose in conjunction with a modicum of wax in compositions intended for coating, decorating and printing wood, metal, paper, cloth, and other surfaces, constitutes a feature of the preferred form of my invention.

I have set forth paraffin or ceresin wax in the preferred compositions, and in general, have preference for a mineral wax; ceresin, because of its amorphous character being of particular value from the standpoint of effective dispersion and adequate proportion at a concentration approaching the surface-defacing point. Beeswax and other waxes or mixtures of waxes, e. g., a mixture of beeswax and ceresin wax having properties like, or approximating the mineral waxes as set forth herein are included within the purview of my invention, which embraces substances, a modicum of which greatly reduces evaporation of the unitary or composite volatile solvent vehicle at room temperature while permitting free escape thereof at slightly elevated temperatures. In its more specific aspects the invention is concerned with a printing paint of the character set forth above.

The proportions in the illustrative example may be varied and the components altered in grade or quality as desired within wide limits (except as regards proportion of wax as has been described). Some of the components are not essential at all times, and plasticizer, for example, may be omitted in some cases. The resinous body likewise may be omitted if a pronounced gloss or strong adhesion is not needed. The unpigmented composition may be employed as a transparent or translucent coating.

What I claim is:

1. In compositions intended for coating, decorating and printing wood, metal, paper, cloth and other surfaces, a medium comprising nitrocellulose, a composite volatile solvent vehicle therefor, a resin, a plasticizer, a pigment, and a modicum of wax greatly reducing evaporation of the solvent vehicle at room temperature while permitting free escape thereof at slightly elevated temperatures; said proportion of wax being below a surface-defacing concentration whereby the composition dries to a smooth glossy surface.

2. In compositions intended for coating, decorating and printing wood, metal, paper, cloth and other surfaces, a medium comprising low viscosity nitrocellulose cooperating with a modicum of wax to greatly reduce evaporation of the solvent at room temperature while permitting free escape thereof at slightly elevated temperatures; said proportion of wax being below a surface-defacing concentration.

3. A printing paint comprising nitrocellulose, a solvent, and from ½ to 2 percent of ceresin wax.

4. A printing lacquer comprising nitrocellulose a solvent containing sufficient alcohol to reduce the viscosity of the solution, and an amount of wax sufficient to reduce evaporation of the solvent but insufficient to cause wax markings on the printed surface.

5. In compositions intended for coating, decorating and printing wood, metal, paper, cloth and other surfaces, a medium comprising nitrocellulose, a volatile solvent, and a modicum of wax greatly reducing evaporation of the solvent at room temperature while permitting free escape thereof at slightly elevated temperatures.

6. In compositions intended for coating, decorating and printing wood, metal, paper, cloth and other surfaces, a medium comprising low viscosity nitrocellulose cooperating with a modicum of wax below a proportion of wax of surface defacing concentration.

7. In the preparation of materials for use

in cellulose ester dopes, the step of grinding pigment in a wax solution, and incorporating the product with a cellulose ester.

8. In the preparation of materials for use in cellulose ester dopes, the step of grinding pigment in a solution of wax and resin, and incorporating the product with a cellulose ester.

9. In the preparation of materials for use in nitrocellulose dopes, the step of grinding pigment in a wax solution containing a plasticizing agent for nitrocellulose, and incorporating the product with a cellulose ester.

10. A material for use in cellulose ester dopes, comprising pigment ground in a wax solution containing a plasticizing agent for nitrocellulose.

11. In compositions intended for coating, decorating and printing wood, metal, paper, cloth and other surfaces, a medium comprising low viscosity nitrocellulose in solution in a vehicle including a wax solution and pigment ground in that wax solution.

12. A composition intended for coating, decorating and printing wood, metal, paper, cloth and other surfaces comprising low viscosity nitrocellulose, a solvent vehicle, and a mineral wax, the ratio of nitrocellulose to wax being high enough to prevent surface marking on a deposited coating.

13. A composition intended for coating, decorating and printing wood, metal, paper, cloth and other surfaces comprising nitrocellulose, a solvent vehicle including an aromatic hydrocarbon diluent and alcohol, and a mineral wax, the amount of wax being sufficient to prevent substantial evaporation of the hydrocarbon diluent at temperatures of about 70° F. without producing surface marking.

14. A composition intended for coating, decorating and printing wood, metal, paper, cloth and other surfaces comprising nitrocellulose, a solvent vehicle including benzol and a mineral wax, the amount of wax being sufficient to prevent substantial evaporation of the benzol at temperatures of about 70° F. but insufficient to prevent substantial evaporation of the benzol at temperatures above 100° F.

15. A composition as set forth in claim 14 in which the amount of wax is below that which will produce undesired surface markings in a coating of the material deposited from the solution.

THEODORE F. BRADLEY.

May 17, 1932. W. S. LAWRENCE 1,858,673

TRANSFER

Filed May 3, 1929

Fig: 1.

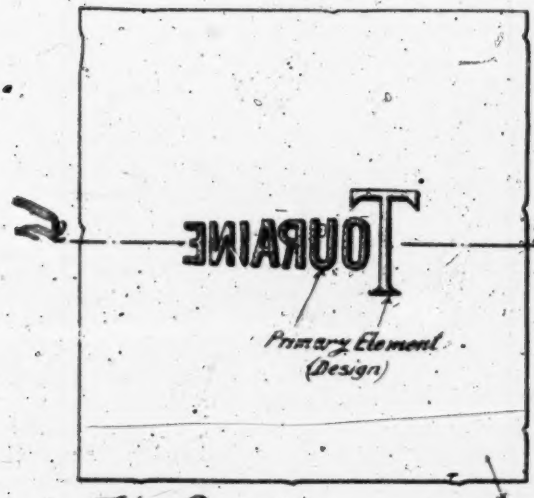


Fig: 2.

Fig: 3.

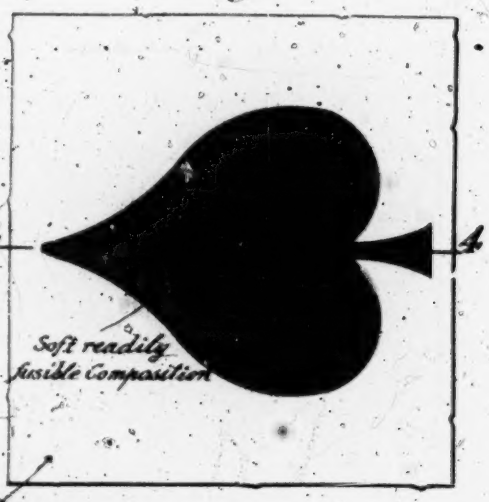


Fig. 4.

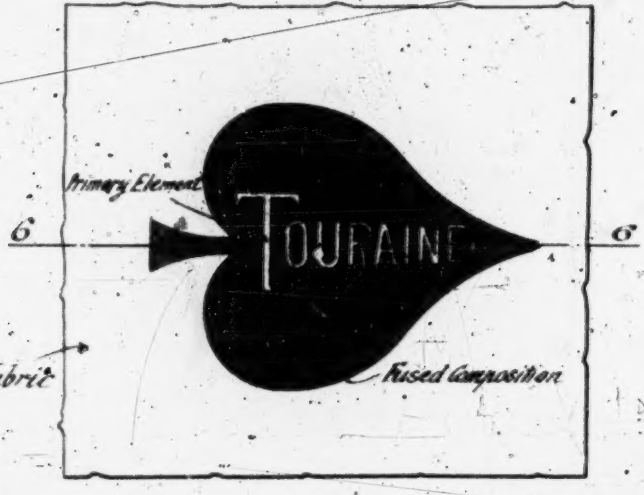
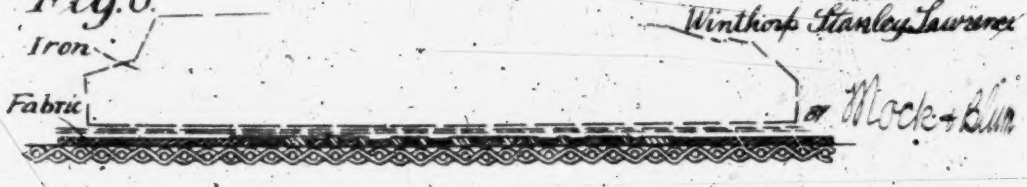


Fig. 6.



INVENTOR
Winthrop Stanley Lawrence
BY Mock + Blum
ATTORNEYS.

Patented May 17, 1932

1,858,673

UNITED STATES PATENT OFFICE

WINTHROP STANLEY LAWRENCE, OF BROOKLYN, NEW YORK, ASSIGNOR TO KAUMAGRAPH COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

TRANSFER

Application filed May 3, 1929. Serial No. 360,305.

My invention relates to a new and improved transfer.

One of the objects of my invention is to provide a new and improved multi-colored transfer, and in particular a new and improved two color transfer.

Another object of my invention is to provide a heat transfer which shall make a very clear and distinct impression so that it can be used to mark fabrics having a complicated and confusing pattern.

Other objects of my invention will be set forth in the following description and drawings, it being understood that the above general statement of the objects of my invention is intended to generally explain the same and not to limit it in any manner.

Fig. 1 is an elevation showing how the primary element on the transfer is applied to the paper base.

Fig. 2 is a sectional view on the line 2—2 of Fig. 1.

Fig. 3 is an elevation showing how the primary element is overprinted with a background.

Fig. 4 is a sectional view on the line 4—4 of Fig. 3.

Fig. 5 shows how the transfer marking is applied to a fabric.

Fig. 6 is a sectional view on the line 6—6 of Fig. 5, the pressing iron being also diagrammatically shown.

In the drawings, the respective parts are indicated by suitable legends.

It has heretofore been a serious problem to produce transfers which could make a clear impression upon materials woven with complicated patterns. It has been proposed to make a transfer which shall produce an embossed impression or to increase the size of the transfer. It is not always possible to use a transfer of the embossing type, and it is usually undesirable to make the transfer too large. It has been proposed to make two color transfers for this purpose, but it was found that the lettering or pictorial elements of the design or the like, would run into the background.

In order to provide a satisfactory two color transfer, I have found it necessary to use a tough plastic slow-fusing composition for making the impression of the trade mark or design, which constitutes what may be called the "primary element" of the transfer. I have also found it necessary to combine this type of composition for the "primary element" of the transfer with a soft waxy quickly melting marking composition for making the background.

I prefer to print a mixture of rosin and wax, combined with suitable coloring ingredients, for forming the readily fusible background. Any suitable quickly-fusing composition may be utilized for this purpose, such compositions being well known in the art per se.

The "primary element" of the two color transfer is preferably made from an ethylated cellulose product sold in the trade as "A. T." cellulose. This is a fine powder consisting of intermixed brownish and whitish particles. This ethylated product can be readily distinguished from cellulose nitrate, because cellulose nitrate is sold in the form of filaments. The ethylated cellulose differs from cellulose acetate because the ethylated cellulose particles are harder and form less of a pulpy mass. Likewise, the ethylated cellulose can be dissolved in numerous solvents in which neither cellulose acetate nor cellulose nitrate are soluble, such as xylol and other benzyl derivatives, such as toluol, for example. As an equivalent for the ethylated cellulose for this purpose, I can use a product sold under the trade name of benzyl cellulose which has substantially the same physical and chemical properties as the ethylated cellulose, save that the benzyl cellulose powder consists of relatively large coarse particles intermixed with finer particles. The ethylated cellulose

and the benzyl cellulose begin to soften at about 150° C., but they then begin to decompose so that it is not possible to liquefy these products without decomposing them. However, these substances can be heated to all ordinary temperature without decomposing, and without melting.

In order to produce a slow-melting composition with the use of these cellulose products, the said cellulose products can be combined in varying proportions with fusible substances, such as resins. Likewise, these cellulose derivatives are soluble in a great many solvents having high boiling points, such as the substance sold under the trade name of "Lindol", and other plastercizers. "Lindol" consists essentially of tri-cresyl phosphate.

Hence, it is not necessary to mix or combine the ethylated cellulose or the benzyl cellulose with a resin. By intermixing these preferred cellulose derivatives with a sufficiently large proportion of a suitable plastercizer, such as lindol for example, and with a sufficient quantity of relatively volatile solvent, a flexible marking transfer composition can be secured.

However, in order to secure an impression of relatively low penetrating power, I prefer to use the following:—

100 parts of ethylcellulose.
90 parts of high melting cumar.
45 parts of butyl carbitol.
75 parts of ethyl abietate (or lindol).
35 parts of No. 6 Lithographic varnish.

Likewise, a quick-fusing composition for the background can consists of the following:

100 parts of rosin.
25 parts of beeswax.
30 parts of ultramarine blue.

The trade name "Cumar" refers to paracoumarone resin. The trade name "Butylcarbitol" refers to the mono-ethyl-ether of diethylene glycol. The trade name "Lindol" refers to tricresyl phosphate.

In order to make the improved two color transfer, an ordinary paper base is first printed with the "primary element" or design, by means of the ordinary intaglio method, such as the use of the ordinary intaglio roller engraved in the well known manner.

The background is now printed with the soft readily fusible composition by the use of the same intaglio printing method.

In order to apply this transfer to a piece of fabric, the ink side of the paper transfer base is applied to the fabric, and the other side of the transfer base then has a hot iron applied thereto. That is, the primary element and the background can be released by heat and pressure.

The soft waxy background first melts and thoroughly penetrates the fabric. The less fusible design or "primary element" then melts, but it does not penetrate the fabric, because the fabric has already become either wholly or partially saturated at this point with the dark background composition. Likewise, the composition forming the printed letters of the design or the like, are relatively non-penetrating and infusible, as previously described.

Hence, the background is printed last and is transferred first.

The printed matter or design has a very light color and the background has a dark color so that it acts as a mask to hide the weave of the fabric. The use of a dark background is particularly desirable when the fabric has a complicated weave. While I prefer to use compositions of different fusibility for the background and for the design, I could also use two very slowly fusible compositions which would not run into each other.

I have shown a preferred embodiment of my invention, but it is clear that numerous changes and omissions could be made without departing from its spirit.

I claim:

1. A heat transfer having a base on which a primary element is printed with a fusible composition, and a background element which overlays said primary element, said background element being printed with a composition which melts at a lower temperature than said first mentioned composition, said primary element and said background element being releasable from said base by means of heat and pressure.

2. A heat transfer comprising a paper base having a design printed thereon by means of a fusible composition, said design being overprinted with a second fusible composition which melts at a lower temperature than the first mentioned composition, said design and the overprinted part of the transfer being releasable from the base by means of heat and pressure.

3. A heat transfer comprising a paper base having a design printed thereon by means of a fusible composition which includes a cellulose product, said design being overprinted with a second design comprising a fusible penetrating composition, said last mentioned composition melting at a lower temperature than said first mentioned composition, said designs being releasable from said base by heat and pressure.

4. A heat transfer having a base on which is printed a primary element and a background which overlays said element, said primary element and said background each consisting of fusible compositions which remain free from each other when they are melted while the transfer is applied, said primary element and said background being releasable from said base by means of heat and pressure.

5. A heat transfer having a base on which is printed a primary element of a light color and a background element of a dark color, said primary element and said background each consisting of fusible compositions which remain free from each other when they are melted, said primary element and said background element being releasable from said base by means of heat and pressure.

In testimony whereof I affix my signature.

WINTHROP STANLEY LAWRENCE.

Patented Apr. 10, 1934 1,954,450

UNITED STATES PATENT OFFICE

1,954,450

MARKING COMPOSITION

Winthrop Stanley Lawrence, New York, N. Y., assignor to Kannagraph Company, New York, N. Y., a corporation of New York

No Drawing. Application February 20, 1930, Serial No. 429,137

4 Claims. (Cl. 41—33)

My invention relates to a new and improved marking composition.

One of the objects of my invention is to provide a new and improved marking composition, which shall be suitable for making a transfer ink of the fusible type.

A transfer ink of this type is used in the molten condition in order to make a marking on a paper base, and the transfer ink is released from the paper base when it is pressed against the fabric or other article to be marked, with simultaneous use of heat.

Another object of my invention is to wholly or substantially eliminate the necessity of using beeswax in fusible transfer inks, as beeswax is very expensive.

Another object of my invention is to provide a wax-like composition which will be non-sticky so that it can be used for printing in warm weather.

Another object of my invention is to provide a composition from which the wax can sufficiently separate when the composition is cooled in order to form a surface film which prevents stickiness.

Another object of my invention is to provide a composition by means of which a sufficiently flexible marking can be formed, so that there is no tendency to chip.

Another object of my invention is to provide a composition which will make it possible to use ozokerite (ozocerite).

Another object of my invention is to provide a composition in which the comparatively cheap ozokerite is combined with a phenol-condensation product, such as "Amberol" together with a blown oil. The name "Amberol" is used in the trade to designate a product which is also identified by the names "Albertol" and "Albertole". These products are generally referred to in the text-book entitled "Synthetic Resins and Their Plastics" by Carlton Ellis, published in 1923, pages 147 and 148. Generally speaking, these products are phenol-formaldehyde condensation resins which have been caused to condense in the presence of an added resin, such as common rosin, so that the resultant product is soluble in benzol, acetone, and the like. These condensation products are also soluble in fatty oils, such as linseed oil.

Other objects of my invention will be set forth in the following description which illustrates a preferred embodiment thereof, it being understood that the above general statement of the objects of my invention is intended merely to generally explain the same and not to limit it in any manner.

Beeswax has heretofore been largely used in making transfer compositions, due to the fact that this material is amorphous and imparts flexibility to a resinous and fusible marking composition. The beeswax also tends to form a waxy film on the surface of the cooled and solidified marking which hinders or prevents offsetting.

When a fusible marking composition which contains beeswax is allowed to solidify and to cool to ordinary room temperature, the wax slightly separates, thus forming the surface film, which prevents the marking from remaining sticky.

Waxes of the type of paraffin, ceresin, etc. which are not amorphous like beeswax, tend to separate to a greater extent, and since such material form minute crystalline particles, the print or marking is brittle so that it tends to chip when it is handled.

Hence, beeswax has been used almost exclusively in making marking compositions in which it was desired to eliminate offsetting. It has heretofore been found impossible to find a cheap substitute for beeswax, save that carnauba wax has been used in small proportions in marking compositions, without however, replacing the beeswax.

I have found it possible to make a very satisfactory composition by combining a suitable phenol-condensation product, such as "Amberol", combined with "Ozokerite", together with a blown oil, such as blown rapeseed oil. The artificial resin known as "Cumar" can also be combined with this composition. Since this composition is neutral, a bronze powder can be added in order to make a gold-colored marking, and this gold-colored marking does not tarnish. This is a decided advantage because when resin and beeswax are used in a composition of this character, the composition then contains certain acids such as the resin acids which produce more or less tarnishing. The composition is extremely stable and waterproof so that the final transfer markings made on a fabric or the like, are resistant to water and to the solutions of any chemicals, such as the washing liquids used in laundry operations. The wax in the composition solidifies very quickly, so that the machine which applies the same can be rapidly operated, and the composition is extremely dry when the paper transfer base is wound up. This is a great advantage when working in hot weather, since ordinary compositions remain hot and soft, so that when the paper base is wound into a spiral roll, offsetting is produced.

To illustrate the invention more specifically, I

give the following example, although I do not wish the invention to be restricted thereto:—

10 parts of "Amberol",
4 parts of ozokerite,
2 parts of blown rapeseed oil,

are fused and intermixed until the melted composition is then thoroughly homogeneous. Any suitable coloring material is then added to the composition with thorough intermixing, and the composition is then ready for use on the machines. It is to be understood that the proportions given in the examples specified herein are by weight.

Another useful composition can be made by melting together the following:—

100 parts of Cumar; varnish grade.
12 parts of ozokerite.
20 parts of blown rapeseed oil.
12 parts of No. 6 lithographic varnish.
5 parts of Butyl Carbitol.
2 parts of cobalt drier.

When the ingredients of this composition have been thoroughly intermixed while the fusible ingredients thereof are in the molten condition, color is stirred in and the composition is then panned.

The chemical formula of Butyl Carbitol is diethylene-glycol-mono-butyl-ether. This solvent has a boiling point of 222° C.

Heretofore in making transfer marking compositions of the fusible type, it has been customary to add a blown oil thereto. This blown oil was only partially oxidized when the transfer was printed by applying the fusible marking composition by means of a suitably engraved roller to a paper base. The transfer marking on the paper base aged by exposure. That is, the outside of the transfer marking contained some of the blown oil which became more oxidized, so as to form a surface film. The portion of the transfer marking which was in contact with the paper base remained unaffected by air.

It was often desirable to age the transfer for a substantial period of time, because a transfer which had an oxidized surface film would not penetrate the fabric as readily as a freshly-made transfer. This caused the transfer marking to remain more on the surface of the fabric, hosiery, or the like, so that the marking was much more clear, and a species of embossed effect was secured. However, the problem of controlling the proper aging of the transfer was a difficult one, because the user of the transfers might require them at varying intervals of time after the transfers were purchased.

In order to hasten the aging action, it has been proposed to use solvents of various kinds in the marking composition. However, the printing of the transfer is usually accomplished when the marking composition is kept at a temperature of 100° C. Ordinary solvents evaporated too rapidly, so that the composition of the marking material varied rapidly, and this expedient was not commercially practical.

The advantage of using Butyl Carbitol is that it is a solvent of the solid materials used in the composition. In addition to having a sufficiently high boiling point, Butyl Carbitol has a high vapor pressure at about 100° C., so that it does not evaporate with sufficient rapidity to substantially vary the composition of the marking material. Many solvents have relatively high boiling points, but they have very low vapor pressures at about 100° C., so that they evaporate too rapidly to be of practical use.

The Butyl Carbitol remains in the composition after the transfer marking has been printed upon the paper base of the transfer, and it then evaporates with sufficient rapidity during the first twenty-four hours, so that the transfer is then sufficiently aged, so that it is possible to immediately use the transfer. The effect is the same as though the ordinary transfer was held in storage for days. The initial relatively-quick evaporation of the Butyl Carbitol causes the formation of a surface film upon the transfer marking, so that the subsequent evaporation of the Butyl Carbitol is very slow. The transfer is therefore maintained in the proper condition for many days. That is, when the composition previously specified has been prepared, and after said composition has been panned, said composition contains a substantial percentage of the Butyl Carbitol. In order to use this composition for printing the marking upon the transfer base, said composition is melted, and it is applied in the usual manner by means of intaglio rollers. The printed marking upon the transfer base contains some of the Butyl Carbitol, and this evaporates with sufficient rapidity during a relatively short time, so that there is a great economy of time and cost in aging the transfer. Likewise, when the transfer has been sufficiently aged to enable it to be used, it remains stable for a long period of time, as the aging effect is not increased.

The improved composition therefore makes it possible to provide a transfer which can be quickly used and which remains relatively stable and unaltered for a sufficiently long period of time for all practical purposes.

While I have found Butyl Carbitol to be the best commercial material available, I do not wish to be limited thereto, as this invention is pioneer in that it provides a marking composition containing a solvent having a boiling point above 100° C. (or other working temperature which may be utilized), and which has a relatively high vapor pressure, so that the composition is maintained substantially constant, and the solvent is carried in a uniform manner into the transfer marking.

Instead of using the Butyl Carbitol which is the liquid solvent I prefer, I may also use certain equivalent substances, although Butyl Carbitol is by far the most efficient substance for this purpose. The substances which may be utilized instead of Butyl Carbitol are as follows:

Pine oil.
Diethyl oxalate.
Mono butyl tartrate.
Nitro benzol.
Carbitol-mono ethyl ether or diethylene glycol.
Butyl oxalate.

I have shown a preferred embodiment of my invention, but it is clear that numerous changes and omissions can be made without departing from its spirit.

I claim:

1. A method of making and aging transfers which consists in printing upon a paper strip, by means of a marking composition having a fusible base which is in the fused condition, said composition also containing a liquid solvent for said base, while maintaining the temperature sufficiently low to cause the printed marking upon the paper base to retain some of said solvent, and then permitting said solvent to evaporate.

2. A method of making a transfer which con-

sists in printing upon a paper strip by means of a marking composition having a fusible base which is in the fused condition, said composition also containing Butyl Carbitol, while keeping the temperature sufficiently low to cause said printed marking to retain some of said Butyl Carbitol, and then permitting said Butyl Carbitol to evaporate.

3. In a transfer having a paper strip, fusible marking imprinted on said strip, said marking having a fusible base, said base comprising a major part of Amberol and a minor part of ozokerite.

4. In a transfer having a paper strip, fusible marking imprinted on said strip, said marking having a fusible base, said base comprising a major part of Amberol and a minor part of ozokerite, and of a blown vegetable oil.

WINTHROP STANLEY LAWRENCE.

Patented Apr. 10, 1934 1,954,627

UNITED STATES PATENT OFFICE

1,954,627

PRINTING INK

Joseph F. Jirousek, Cleveland, Ohio, assignor, by direct and mesne assignments, to Mir-A-Cel Incorporated, Cleveland, Ohio, a corporation of Ohio

No Drawing. Application April 18, 1932, Serial No. 606,681

8 Claims. (Cl. 134—36)

With the customary printing inks a great loss of time is incurred in setting or drying before the further steps of cutting, folding, assembling and binding can be attended to. Efforts to ameliorate this have resulted in premature hardening of inks on the surfaces of the inking rolls, inking plates, etc., as well as filling up the depressions in half-tone forms and the like, "skinning over" in cans and inking mechanism, and difficulties in cleaning. A composition however, which can set quickly and dry rapidly and also handle and feed properly and distribute freely is thus an important desideratum and highly desired in the art.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features hereinafter fully described, and particularly pointed out in the claims, the following description setting forth in detail certain illustrative embodiments of the invention, these being indicative however, of but a few of the various ways in which the principle of the invention may be employed.

In accordance with the present invention, I make a composition of the following ingredients and general ratio of proportions. A wax ½–¾ part by weight, and rosin oil ½ part, paraffin wax being preferable, although other waxes, as bees wax, Chinese wax, spermaceti, etc. may be used, and in some instances I may include petrolatum with the paraffin or other wax under this heading; 1–6 parts of an inorganic bodying agent (preferably dry aluminum hydrate, or in some cases chalk, magnesium oxide, etc.); 10–14 parts of a drying oil (as boiled linseed oil, or tung oil); 1–6 parts of a varnish-type resin and a low boiling cutting solvent (preferably copal for instance 8–10 per cent in alcohol or mineral spirit solvent, or in some cases amber, kauri, synthetic resins, glyptals, etc.); 6–9 parts of pigment (carbon black or desired colors, as reds, blues, greens, yellows, white, etc.); ⅛–2 parts of drier (japan, lead compounds, cobalt linoleate or resinate, manganese linoleate, resinate or borate, etc.); 1–10 parts of hydrocarbon solvent (as kerosene, varnish makers and painters naphtha, etc.); and ½–2½ parts of an organic solvent liquid of boiling point above 100° C. (preferably benzyl alcohol, or in some cases ethylene glycol mono-ethyl ether, ethylene glycol mono-ethyl ether acetate, amyl acetate, butyl acetate, amyl alcohol, butanol, and mixtures, etc.).

As an illustrative example:—A mixture is made up, employing grinding rolls for instance, comprising 30 pounds dry Royal blue pigment, 15 of heat-treated linseed oil, commonly known as thin plate oil, 6 of double-boiled linseed oil, 8 of iron blue dry pigment, 8 of petrolatum, 8½ of litho-varnish, 7 of dry purple toner pigment, ½ of kauri, 16 of alkali blue red shade in paste form, 32 of dry aluminum hydrate, 16 of rosin oil, second run, 16 of paraffin wax, 32 of cobalt drier, and 32 of kerosene. A mixture of 324 of heat-treated linseed oil, commonly known as heavy plate oil, and 128 of dry carbon black, is separately ground, and this mixture and the foregoing are then ground together, and 152 of copal varnish (9½ per cent of copal, with 35½ per cent vegetable drier and 55 per cent mineral spirits) are incorporated, and 76 of benzyl alcohol.

In the use of such compositions, immediately after the impression is made, heat should be applied, and most advantageously this may be accomplished by a suitable heater, electric, gas, etc., arranged on or adjacent the press, so that the delivered printed impression is subjected to a substantial degree of heat to complete the setting action.

Such compositions may be made up for black or for all colors for printing purposes, whether from type or by various transfer processes upon paper, cardboard, cartons, cloth, leather imitation leather, cellophane, glassine, celluloid, wood, tin, aluminum, tin-foil, and other materials that can be printed or lithographed. Such composition exhibits a superior covering power, a very thin film being sufficient to carry the requisite density, and the detail in half-tone printing and the like is sharper, with deeper perspective and clearer prints than available with customary compositions. On color work of more than one color, where each color is printed singly, the present composition will trap or superimpose regardless of the time elapsed between printings, the composition having a natural affinity for and laying particularly well upon previously printed colors. With the present composition also, the setting or drying is almost instantaneous as the printed impression is exposed to heat, thereby obviating transfer to the tympan, and work in process can be handled with great rapidity, regardless of how many colors are superimposed. As a result of the rapid throughput, changes in paper for instance due to expansion or contraction, moisture up-take, etc., can in large measure be avoided, and a more perfect register of successive colors on forms requiring such can be had, in contrast to prior difficulties in this direction. Jobs can be printed on both sides in one operation with one or

more colors on both sides of the sheet without smearing or offset, and trapping or superimposing of colors takes place without requirement of particularity relative to printing tack, and the work may proceed to the next operation, such as cutting, folding, stitching, trimming, and other bindery operations.

By reason furthermore, of a particularly hard surface finish, impressions so made do not scratch or mar readily, as is commonly the case with ordinary inks. If a press operation has to be interrupted, my composition also has an outstanding advantage of not drying or skinning over in the fountain or on the press, and cleaning may be readily accomplished.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the details described, provided the features stated in any of the following claims, or the equivalent of such, be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. A printing ink, comprising ½–¾ part of a wax, 1–6 parts of an inorganic bodying agent, 10–14 parts of a drying oil, 1–5 parts of a resin and low boiling solvent therefor, 6–9 parts of a pigment, ⅛–2 parts of drier, and a solvent including an organic solvent liquid constituent of boiling point above 100° C.

2. A printing ink, comprising ½–¾ part of a wax, ½ part of rosin oil, 1–6 parts of dry aluminum hydrate, 10–14 parts of a drying oil, 1–5 parts of a resin and low boiling solvent therefor, 6–9 parts of a pigment, ⅛–2 parts of drier, and a solvent including an organic solvent liquid constituent of boiling point above 100° C.

3. A printing ink, comprising ½–¾ part of a wax, ½ part of rosin oil, 1–6 parts of an inorganic bodying agent, 10–14 parts of a drying oil, 1–5 parts of a resin and low boiling solvent therefor, 6–9 parts of a pigment, ⅛–2 parts of drier, and a solvent including ½–2½ parts of benzyl alcohol.

4. A printing ink, comprising ½–¾ part of a wax, ½ part of rosin oil, 1–6 parts of an inorganic bodying agent, 10–14 parts of a drying oil, 1–5 parts of a resin and low boiling solvent therefor, 6–9, parts of a pigment, ⅛–2 parts of drier, 1–10 parts of a hydrocarbon solvent, and ½–2½ parts of benzyl alcohol.

5. In printing ink, comprising ½–¾ part of a wax, ½ part of rosin oil, 1–6 parts of dry aluminum hydrate, 10–14 parts of drying oil, 1–5 parts of copal and low boiling solvent therefor, 6–9 parts of a pigment, ⅛–2 parts of drier, and a solvent including an organic solvent liquid constituent of boiling point above 100° C.

6. A printing ink, comprising ½–¾ part of a wax, ½ part of rosin oil, 1–6 parts of dry aluminum hydrate, 10–14 parts of a drying oil, 1–5 parts of copal and low boiling solvent therefor, 6–9 parts of a pigment, ⅛–2 parts of drier, 1–10 parts of a hydrocarbon solvent, and ½–2 parts of an organic solvent liquid constituent of boiling point above 100° C.

7. A printing ink, comprising ¾ part of a wax, ½ part of rosin oil, 1 part of an inorganic bodying agent, 11 parts of a drying oil, 5 parts of a hard resin and low boiling solvent therefor, 6–9 parts of pigment, 1 part of cobalt drier, 1–10 parts of kerosene, and 2½ parts of benzyl alcohol.

8. A printing ink, comprising ¾ part of a paraffin wax, ½ part of rosin oil, 2 parts of dry aluminum hydrate, 8–12 parts of boiled linseed oil, 5 parts of copal and low boiling solvent (copal 9½ per cent with vegetable drier 35½ per cent and mineral spirits 55 per cent), 6–9 parts of pigment, 1 part of cobalt drier, 1–10 parts of kerosene, and 2½ parts of benzyl alcohol.

JOSEPH F. JIROUSEK.

A Summary of the

CHEMICAL PRODUCTS

of the

Carbide and Carbon Chemicals Corporation

SECOND EDITION
JANUARY 1, 1929

CARBIDE AND CARBON CHEMICALS CORPORATION
Carbide and Carbon Building
30 EAST 42nd STREET NEW YORK, N. Y.
Unit of Union Carbide UCC *and Carbon Corporation*

Carbitol

(Trademark)

(Diethylene Glycol Monoethyl Ether)

Specifications

Boiling Range	175-195°C. 90% distills over between 190-200°C. at 760 mm.
Initial Boiling Point	Not less than 180°C. at 760 mm.
Dry Point	Not more than 210°C. at 760 mm.
Color	Not more than 2.0 yellow (Lovibond Tintometer)
Purity	Not less than 90% Carbitol
Specific Gravity	1.021 to 1.030 at 20°/20°C.
Weight	8.5 pounds per gallon at 15.6°C.

CONTAINERS

1 gal. can	Net Content	8.5 lbs.
5 gal. drum	Net Content	40 lbs.
10 gal. drum	Net Content	80 lbs.
55 gal. drum	Net Content	425 lbs.
110 gal. drum	Net Content	850 lbs.

CARBITOL is the trademark for the monoethyl ether of Diethylene Glycol manufactured and sold by Carbide and Carbon Chemicals Corporation. It is an excellent solvent for nitrocellulose and resins and is miscible with the common diluents of lacquers. These characteristics combined with its very low rate of evaporation have brought about its use as a solvent for nitrocellulose in brushing lacquers and other industrial products.

Butyl Carbitol

(Trademark)

(Diethylene Glycol Monobutyl Ether)

Specifications

Boiling Range	Not less than 90% distills over from 222 to 232°C. at 760 mm.
Initial Boiling Point	Not less than 215°C. at 760 mm.
Dry Point	Not more than 235°C. at 760 mm.

COLOR	Not more than 2.0 yellow (Lovibond Tintometer)
SPECIFIC GRAVITY	0.962 to 0.972 at 20°/20°C.
WEIGHT	8.1 pounds per gallon at 15.6°C.

CONTAINERS

1 gal. can	Net Content	8 lbs.
5 gal. drum	Net Content	35 lbs.
10 gal. drum	Net Content	75 lbs.
55 gal. drum	Net Content	400 lbs.
110 gal. drum	Net Content	800 lbs.

BUTYL CARBITOL is the monobutyl ether of Diethylene Glycol. This compound possesses a mild odor, is soluble in water and is an excellent solvent for nitrocellulose and resins. As indicated by its boiling point Butyl Carbitol is intermediate between the "high boiling" nitrocellulose solvents and the plasticizers. In consequence it is especially useful in pyroxylin dopes and other plastics where a solvent with an extremely low rate of evaporation is required.

Ethylene Dichloride

Specifications

ACIDITY	Not more than 0.0005% calculated as HCl
BOILING RANGE	Not less than 90% distills over from 81.7 to 84.7°C. at 760 mm.
INITIAL BOILING POINT	Not less than 78°C. at 760 mm.
DRY POINT	Not more than 86°C. at 760 mm.
COLOR	Not more than 2.0 yellow (Lovibond Tintometer)
SPECIFIC GRAVITY	1.254 to 1.264 at 20°/20°C.
WATER	Not more than 0.3%
WEIGHT	10.4 pounds per gallon at 15.6°C.

CONTAINERS

1 gal. can	Net Content	10 lbs.
5 gal. drum	Net Content	45 lbs.
10 gal. drum	Net Content	90 lbs.
55 gal. drum	Net Content	500 lbs.
110 gal. drum	Net Content	1000 lbs.
Tank car	Net Content	8000 gals.

PHYSICAL PROPERTIES

	FORMULA	Molecular Weight	Specific Gravity 15°/15°C.	Boiling Point °C.	Flash Point °C.	Flash Point °F.	Solubility in 100 Grams Water at 20° C.	Vapor Pressure mm. Hg at 20° C.	Pounds per Gallon
Butyl Carbitol*	$CH_2OH.CH_2OCH_2.CH_2OC_4H_9$	162.14	0.9732	222	117	242	Completely	0.05	8.07
Butyl Cellosolve†	$CH_2OH.CH_2OC_4H_9$	118.11	0.9188	170.6	61	141	5.0	0.85	7.65
Carbitol*	$CH_2OH.CH_2OCH_2.CH_2OC_2H_5$	134.11	0.9996	198	91	201	Completely	0.13	8.32
Cellosolve†	$CH_2OH.CH_2OC_2H_5$	90.08	0.9360	134.8	40	101	Completely	4.60	7.80
Cellosolve† Acetate	$CH_3OC_2H_4.CH_2C_2H_3O_2$	132.09	0.9820^{15}	153	53	127	22.0	1.25	8.18
Methyl Cellosolve†	$CH_2OH.CH_2OCH_3$	76.06	0.9748	124.5	29	85	Completely	7.50	8.12
Diethylene Glycol	$CH_2OH.CH_2OCH_2.CH_2OH$	106.08	1.1212	245	124	255	Completely	< 0.01	9.33
Ethyl Benzene	$C_6H_5.C_2H_5$	106.08	0.8720^{20}	135	15	59	Insoluble	7.40	7.26
Ethylene Chlorhydrin 42.3%	$CH_2OH.CH_2Cl$	80.49	1.0970	96	66	150	Completely	12.50	9.13
Ethylene Dichloride	$CH_2Cl.CH_2Cl$	98.93	1.2569^{15}	83.5	14	57	0.87	78.00	10.46
Ethylene Glycol	$CH_2OH.CH_2OH$	62.04	1.1166	197.2	111	232	Completely	0.09	9.30
Triethanolamine	$(CH_2OH.CH_2)_3N$	149.12	1.1240^{15}	277-279 @ 150 mm	185	365	Completely	< 0.01	9.36

* *Carbitol is the Trademark for the Monoethyl Ether of Diethylene Glycol, Manufactured and Sold by Carbide and Carbon Chemicals Corporation.*

† *Cellosolve is the Trademark for the Monoethyl Ether of Ethylene Glycol, Manufactured and Sold by Carbide and Carbon Chemicals Corporation.*

"Custom Built" Solvents

METHYL CELLOSOLVE ★
CELLOSOLVE ★
CELLOSOLVE ★ ACETATE
BUTYL CELLOSOLVE ★
METHYL CARBITOL ★
CARBITOL ★
BUTYL CARBITOL ★

THESE MATERIALS are the first of a series of solvents that have been "custom built" in our laboratories to specifications set up by the chemical industry.

With boiling points ranging from 124°C to 222°C, with a great variety of solvent properties and with varying degrees of water solubility, these solvents have acquired a wide scope of usefulness as indicated by the following few examples:

Solvents in Cellulose Nitrate and Acetate Lacquers
Adhesive for moisture-proof Cellophane
Dye Solvents in Printing and Vat Dyeing
Coupling Agent in Soluble Oils
Laminated Glass
Dry Cleaning
Cosmetics

Our Technical Department is in a position to apply these solvents to your needs. Your inquiry on the application of these compounds to your problems will receive prompt attention. Address

PRODUCTS MANUFACTURED BY CARBIDE AND CARBON CHEMICALS CORPORATION

ACETONE
BUTYL CARBITOL ★
BUTYL CELLOSOLVE ★
CARBITOL ★
CARBOXIDE ★
CELLOSOLVE ★
CELLOSOLVE ★ ACETATE
DICHLORETHYL ETHER
DIETHYLENE GLYCOL
DIOXAN
ETHYLENE DICHLORIDE
ETHYLENE GLYCOL
ETHYLENE OXIDE
ISOPROPANOL
ISOPROPYL ETHER
METHYL CARBITOL ★
METHYL CELLOSOLVE ★
METHANOL
PROPYLENE DICHLORIDE
PROPYLENE GLYCOL
PROPYLENE OXIDE
TRIETHANOLAMINE
TRIETHYLENE GLYCOL
VINYL CHLORIDE
VINYLITE ★ RESINS

BUTANE · ETHYLENE · ISOBUTANE
ETHANE · PROPANE · PROPYLENE
ACTIVATED CARBON · PYROFAX ★

★ Trade-mark Registered

CARBIDE AND CARBON CHEMICALS CORPORATION
30 East 42nd Street, New York
230 N. Michigan Avenue, Chicago

Unit of Union Carbide and Carbon Corporation

CARBIDE AND CARBON CHEMICALS CORPORATION IE-4-31
New York, N. Y.

Please send me further information about your _____ (Name of product)

Name _____
Company _____
Street _____
City _____ State _____

Ref Ex G

Plastic Printing Inks for Rapid Drying

By M. E. Hanson*

(Concluded from Last Month)

The ozone generators consume very little power and are well worked out but are very expensive, both as to first cost and upkeep. The apparatus for applying cooled ozone to the heated inked surface, though fairly well worked out, is complicated and seriously fills up the all-to-little press space.

Three or four manufacturers have developed varnish vehicles of this general character for all colors, advertising them as heat and ozone reactive inks. Printing with them and using heat and ozone as high as 60 impressions per minute have been obtained, the ink drying in about two seconds, being dry before it reached the folding devices. It probably will be possible to greatly increase the number of impressions per minute but there always will be that intransmutable time element present while the ink is absorbing oxygen and consequently considerable more space and length of web will be required between the first impressions and those on the reverse side of the folder. Too, it has been found that heat and ozone can readily be buried in the stack when no folder is used by applying heat and ozone in more moderate forms to the surface of the running sheet. Drying is sufficient to set the ink enough so that no slip sheets are required, the whole stack being dry in a few minutes. With the ordinary inks employing no heat or ozone, the drying time was 8 to 10 hours and slip sheets were required.

It is clear that an ink capable of drying into a hard film without necessarily absorbing any oxygen is most desirable. Thus we develop a general characteristic for a plastic ink, namely one that will not dry in a thin film exposed to room air at 80° F. for several hours, as it might be spread upon rolls or plates, but merely at a touch of heat after being printed upon the paper dries almost instantly.

We find many plastic substances which dry or harden with little or no absorption of oxygen. Their hardening takes place when heat is applied to evaporate the thinners or solvents used when compounding the constituent elements. When we make measurements of the heat required for drying we find that more heat had to be used than is theoretically necessary to drive off or evaporate the known weight of solvents present. Why is this extra heat required? Delving more into theory, we find two probable reactions taking place which employ this extra heat as the motive force. One reaction is that when the solvent leaves the plastic substances, molecules of the solvent have to be torn away from molecules of plastic, and as there is an electrical attraction between them, energy is required to accomplish the separation. This leaves the molecules of plastic with an unsatisfied electrical charge. As the solvent thins out, molecules of the plastic substances come closer together. As they become packed sufficiently close the unsatisfied electrical charges, some negative or lower in potentiality to the positive charges of others, cause a natural selection of opposite electrical attraction between the plastic molecules. An entirely new arrangement takes place. If it were not for friction of some sort the transition would take place with the speed of an electrical discharge or the speed of light. The second employment for the extra heat is to aid the electrical attraction to overcome this friction more speedily. Thus we have reactions entering into the drying and hardening of a plastic film that naturally take place quickly.

One thing we must learn to do is to control these reactions in various ways. This may be done by varying chemical mixtures used, choice of different solvents, use of mordants, measure and degree of plasticising, etc., to get the right degree of "tack," the right viscous body, the right mechanical balance between different colors, all according to different printers' specifications. This control must be simply worked out to meet ready and accurate use in the ink room.

The solvents available have different boiling points ranging through a broad scale, but unfortunately for this problem their vapor pressure curves are nearly parallel. If we choose one from the group with a boiling point well under 250° F., the highest practical heat to apply to a printed sheet, we find that at room temperature its vapor pressure is still so great that drying will progress rapidly. On the other hand, if one is selected with a vapor pressure so low at room temperature that little drying takes place, at 200° to 250° F., we find the boiling point hardly attained or not even reached.

If we could only flatten the curve of a high boiling solvent with a vapor pressure of 5 in. of mercury or less at 80° down to a point where at 30 in. the boiling temperature would be reduced to only 150° or so it would not take us long to compound an ink to meet the general characteristics for a plastic ink set forth above.

Our problem becomes one to get the effect by indirect means. There is little obtainable information as to the sums of the partial pressures of mixtures of two or more solvents but it is certain that they do not closely follow direct proportional rules and some very odd results obtain. The drying result can be further affected by the kind, number and method synthesizing the combination of plastic gums present, the degree to which they have been worked, milled or agitated, the amount and kind of solvents employed and the temperatures and pressures to which the whole or parts are subjected during process of manufacture. This opens up a none-too-well explored field of research. Further, there are mordants and also catalytic chemicals servicable to produce varying effects. Certain it is there are many combination which will produce a desirable ink vehicle where there are so many elements and combinations to draw from.

The general characteristic for a plastic ink vehicle develops into a preliminary specification as follows:

1. One not hardening on rolls, plates or in fountain at room temperature even if press is stopped for several hours.
2. One when heated on the printed sheet to not over 250° F. will harden or dry in a small fraction of a second.
3. One having no great amount of solvent present.
4. One thickening very slowly in fountains if at all.
5. One suitable for milling into it prescribed colors under ordinary ink room conditions.
6. One when even dry on plates on rolls may be washed off easily with a cheap and inoffensive solvent.
7. One presenting no increased fire hazard.
8. One, when as a vehicle, is nearly water white.
9. One capable of being furnished in several body weights or degrees of "tack."
10. One that will not deteriorate glue or soft rubber inking rolls.
11. One capable of long storage in the can without deterioration.
12. One drying with a good body and brilliancy.

Little interest has been shown in plastic inks until the last twelve months. Since then a great deal has been done. Previous to that time samples have been made or formulas suggested by one chemist or another for fast-drying ink plastics.

Continued on page 25

*Mechanical and Chemical Engineer, Collingswood, N. J. Member American Society of Mechanical Engineers.

Plastic Printing Inks for Rapid Drying

Continued from page 9

The first remembered were samples made by chemists working on light-weight paints for painting airplane wings during the war. Cotton, camphor, celluloid, rubber, paper, wool and even straw were some of the ingredients. They were inexpensive and lasting enough for an ink but they all were of a type which dried too quickly in the fountains and on the rolls and plates. Recently, however, samples from several manufacturers have shown enough improvement in this respect to make a pretty good ink. Solvents, too, have been so greatly reduced as to prove no serious objection in the pressroom.

One manufacturer has presented an ink capable of drying with a very brief exposure to heat which will remain moist on inking rolls and plates for a long time. There are many points to be worked out concerning its use as a commercial ink for magazines or newspapers. It gives great promise, however, there being little doubt as to its ultimate success if the necessary work upon it is persistently carried on to a finish. Others are close behind.

The use of such an ink when perfected will eliminated wax sprays, slip sheets or offset paper rolls for multi-color commercial printing. It will be less expensive and save in addition many considerable factors in manufacture and cost of production. It will make possible newspapers printed in multi-color daily as cheaply as those which are now printed in black. There will be no trouble with registry upon a color cylinder. As these inks can be dried in a foot or two of web length, colors may be applied immediately on the reverse side and go directly to the folding devices at present press speeds. Some very fine pictures and advertising illustrations have been experimentally produced in colors on regular newspaper stock. If desired, the rough, porous nature of the paper can be taken care of just under the picture only by means of a rapid-drying printed ground color film. The ground coat is required only when particularly fine illustrations are required, like the reproduction of an oil painting for example.

It is safe to predict for the very near future newspaper colored back-page advertising of a high-class type comparable with our good magazines.

As we emerge shortly from this present state of depressed business we will find many changes in the order of things. One of the changes will be an increased use for advertising in selling. Good illustrations are far more effective than high-sounding descriptive phrases. The newspaper can fill a need never reached by the magazines. They need not be viewed as competitors in any sense. Magazines are national mediums and newspapers are strictly local mediums with few exceptions. There is no reason at all why newspapers should not find good illustrative advertising in colors profitable.

Edward J. Volz

Continued from page 8

and has encouraged the establishment of unemployment benefit systems by local unions.

By virtue of his office he is a member of the board of governors of the International Allied Printing Trades Association composed of the executive officers of the five major international printing trades' unions; member of advisory committee (representing American Federation of Labor) of prison industry and wages; chairman committee on banking and Insurance, New York State Federation of Labor; chairman committee on insurance, Central Trades and Labor Council of New York City; member of advisory committee, Federation (Labor) Bank & Trust Company of New York City, and a member of the advisory committee, Union Labor Life Insurance Company.

Burgess Chrome Mats

A Laboratory Product

OUTSTANDING

IN QUALITY • A firm bodied, practically non-porous mat, constructed of the highest quality materials, producing unquestionably the finest printing stereotype plates.

IN SERVICE • Our representatives are seasoned, experienced practical men—able and willing to assist you at all times to alleviate or eliminate your stereotyping troubles. Their services are yours for the asking.

IN PRICE • We quote as low a price as is commensurate with quality and good business practice. Our prices are published, the same to one and all, having no special discounts for cash, quantity purchases or contracts. A fair and square deal for all is our policy.

Our claim to your patronage rests on our ability to maintain the above to your entire satisfaction.

BURGESS CELLULOSE COMPANY

Division of C. F. Burgess Laboratories, Inc.

Freeport, Illinois

Defendant's Exhibit N-2.

Wood et al U. S. Patent No. 1,261,885.

Brunell U. S. Patent No. 1,592,806.

Brunell U. S. Patent No. 1,665,185.

Ullstein British Patent No. 249,472.

(Opposite ☞)

J. WOOD & W. ARMSTRONG.

APPARATUS FOR PRINTING MAGAZINES AND SUCH LIKE WORK.

APPLICATION FILED FEB. 18, 1915.

1,261,885. Patented Apr. 9, 1918.

2 SHEETS—SHEET 1.

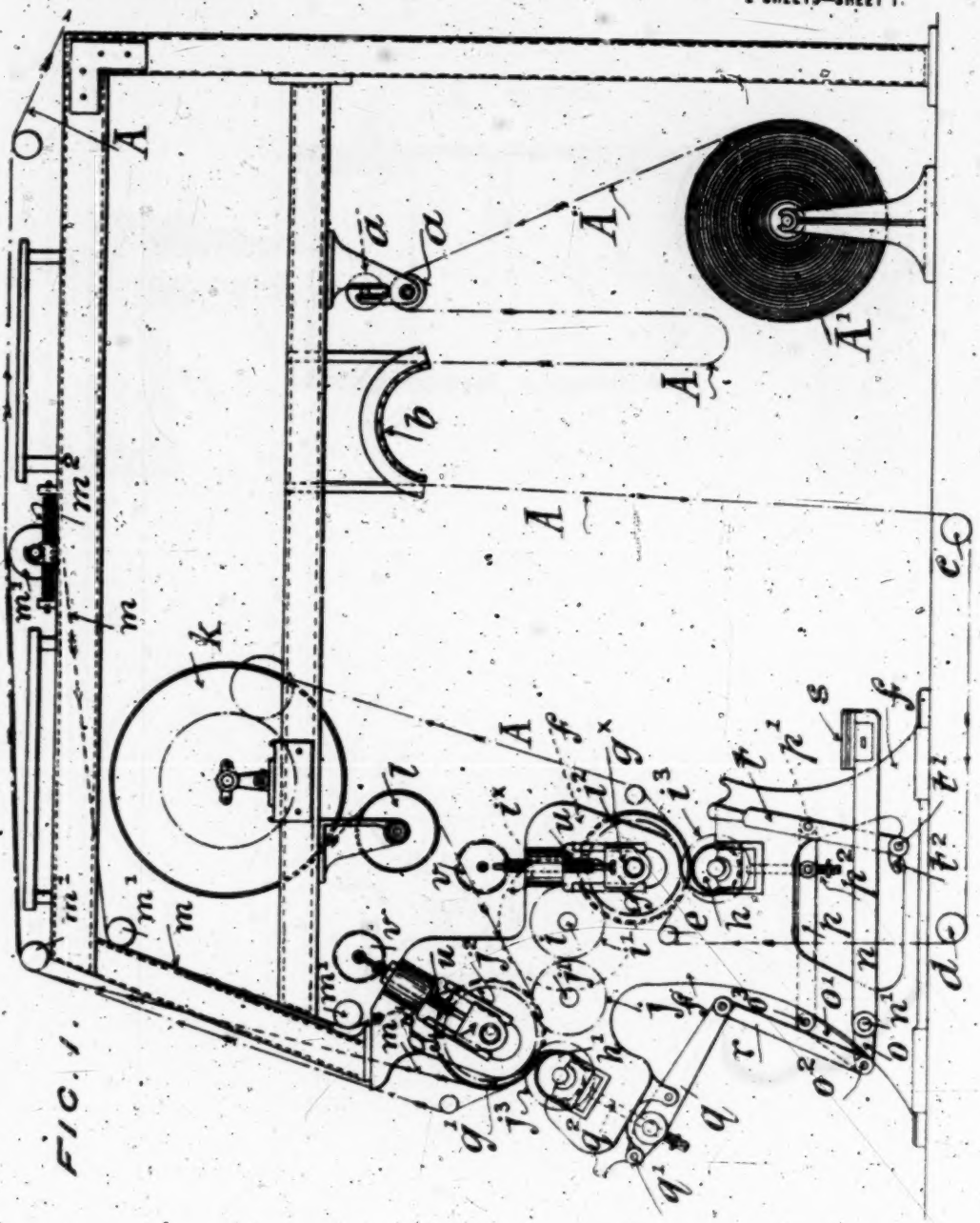


FIG. 1.

WITNESSES:

John C. Sanders

Robert F. Heuman

INVENTORS:

John Wood

By William Armstrong

W. Wallace Clark

ATTY.

J. WOOD & W. ARMSTRONG.

APPARATUS FOR PRINTING MAGAZINES AND SUCH LIKE WORK.

APPLICATION FILED FEB. 16, 1915.

1,261,885.

Patented Apr. 9, 1918.

2 SHEETS—SHEET 2.

FIG. 2.

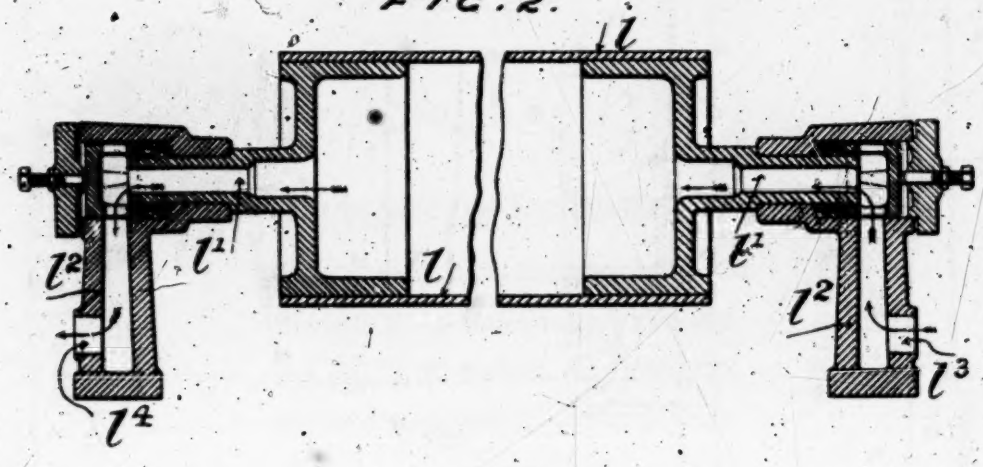
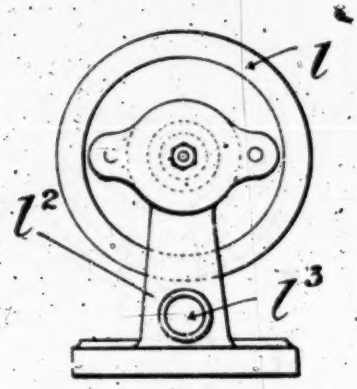


FIG. 3.



WITNESSES:

John C. Sanders

Albert F. Heumann

INVENTORS:

John Wood

William Armstrong

BY Wallace Mick

ATTY

UNITED STATES PATENT OFFICE.

JOHN WOOD AND WILLIAM ARMSTRONG, OF RAMSBOTTOM, ENGLAND.

APPARATUS FOR PRINTING MAGAZINES AND SUCH LIKE WORK.

1,261,885. Specification of Letters Patent. Patented Apr. 9, 1918.

Application filed February 16, 1915. Serial No. 8,498.

To all whom it may concern:

Be it known that we, JOHN WOOD and WILLIAM ARMSTRONG, subjects of the King of Great Britain and Ireland, residing at Garden Engineering Works, Ramsbottom, in the county of Lancaster, England, have invented new and useful Improvements in Apparatus for Printing Magazines, and Such like Work, of which the following is a specification.

This invention relates to a machine or apparatus for photogravure or intaglio printing whereby reproductions by photogravure processes can be obtained and printed on one but usually on both sides of a passing web. Such processes are at present in use and need not be dealt with here, it being sufficient to say that two separate printing arrangements have been utilized necessitating the paper traveling to some considerable extent in horizontal paths or paths inclined to the horizontal.

The object of our invention is to obtain an extremely compact machine or apparatus for our purpose by combining in the one head or printing mechanism proper, both the two backing bowls and the two printing cylinders or rollers so that the same are adjacent to each other and located at one end of the apparatus. In effect we use according to our system a duplex printing arrangement and have all the parts combined and grouped at one head and whereby the paper can pass to and fro in more or less vertical or inclined paths instead of having horizontal or approximately horizontal travel.

In the machine or plant we prefer to employ a fluid cooled roller or rollers for cooling the passing web or paper, which is an important feature in our proposed apparatus for duplex photogravure printing.

We also arrange to so carry the printing cylinders or rollers that same can be simultaneously adjusted or moved with respect to the backing bowls over which the paper passes to be printed, or, alternatively, we arrange to adjust the backing bowls to the printing cylinders or rollers.

We will now proceed to clearly indicate the invention by a full description of one form of printing machine which will carry out our object, and which combines the features of novelty above indicated, and, in this description, the attached drawings will be referred to.

In the said drawings:

Figure 1 shows a general side elevation of a single color duplex or perfecter photogravure printing machine of the type and possessing the features indicated in the preamble.

Fig. 2 is a detail section of a water cooled roller which we prefer to employ.

Fig. 3 is an end view of Fig. 2.

Referring in particular to the construction illustrated generally in the attached drawing, we take the paper A to be printed from a batch or reel such as A′ at one end of the apparatus and lead same upward to drawing rollers *a a* or such like, then down if necessary and over a saddle such as is marked *b*. From the saddle, the paper A preferably passes downward to a roller *c* and from thence it may pass in a horizontal direction and over rollers *d e* toward the printing mechanism to which it preferably passes upward from below. The actual printing combination comprises end frames *f f* in which are carried two sets of backing bowls and printing cylinders or rollers, that is, a backing bowl and printing roller for each side of the paper. The backing bowl in the first set is marked *g* and the printing cylinder or roller *h*, while the backing bowl of the second set is marked *g′* and the printing cylinder or roller *h′*. As shown, the two sets lie adjacent and are interconnected for driving and other purposes and this is preferably done by spur wheels on shafts or studs carried by the end frames. The driving arrangement illustrated is a very simple one, and, consists of a main driving shaft *i* having a spur wheel *i′*, said shaft having fast and loose pulleys *i²* or being driven by gear. The spur wheel *i′* gears with a crown or spur wheel *i³* on the first impression bowl shaft and this wheel *i³* meshes with a spur wheel *i⁴* on the first printing cylinder or roller *h* as is clearly shown. On the left of the spur wheel *i* is an intermediate spur wheel *j* on the stud or other shaft *j′*, and this intermediate spur wheel *j* gears into the crown or spur wheel *j²* on the second backing bowl shaft, which crown or spur wheel *j²* gears into and drives the spur wheel *j³* on the second printing cylinder or roller *h′*.

The ascending paper A traveling over the roll *e* passes between the first backing bowl *g* and printing roller *h* and is printed as to one face, and then goes upward and

travels around a revolving steam heated or drying cylinder such for example as the copper drying cylinder *k*. After passing around such cylinder, the paper is guided around a provided cooling device and preferably is caused to contact with a revoluble water cooled roller *l* which contains water or has cooling liquid circulated therethrough. Such roller is very clearly illustrated in detail by Figs. 2 and 3 of the drawings. The hollow shafts *l'* *l'* are supported by hollow brackets l^2 l^2, said shafts being properly packed by packing and glands as shown.

Water or cooling liquid enters at l^3, passes through the hollow roller *l* and leaves at the outlet l^4.

This roller *l* effects cooling of the paper, and, from that, the paper passes between the second backing bowl *g'* and the second printing cylinder or roller *h'*. The drying cylinder and water cooled roller or rollers are most conveniently situated immediately above the duplex printing mechanism, as the drawing shows, and can be easily supported by girders or framework. In connection with the second backing or impression bowl *g'* we use a traveling backing blanket *m* which passes over suitable guide rollers *m'* and is kept sufficiently taut by the tension device m^3.

After leaving the second printing elements, the paper is led upward over guide rollers and passes across suitable drying sheets, chests, or the like to the cutting machine.

In order to have proper control over the printing mechanism we find it necessary to provide means to adjust or move the printing cylinders or rollers and attendant parts and with this object in view we may use lever and link mechanism of a form which will give simultaneous adjustment of the two printing cylinders or rollers *h*, *h'*. The form of lever and link mechanism shown in the drawing consists of a strong lower horizontal lever *n* fulcrumed at *n'* on a shaft supported in the frame and having short extension levers *o* to which links *o'* are connected at o^2, these links *o'* being jointed at o^3 to second levers *p* pivoted to the frame at *p'* and which levers *p* have a nut and screwed spindles p^2, which latter act on the bearing blocks of the first printing cylinder or roller *h*, and so movement of the levers *p* effects movement of the first printing cylinder or roller *h*. To similarly influence the second printing cylinder or roller *h'*, we also utilize additional inclined or other levers *q* fulcrumed at *q'* and such levers carry nuts for screwed adjusting spindles q^2 which act on the bearing blocks of the second printing cylinder or roller *h'*. The levers *q* are acted on and connected by links *r* jointed to the short extensions *o* influenced by the lower horizontal lever *n*. Adjustable weights *s* on this lower horizontal lever *n* keep the printing cylinders or rollers up to their work. To effect simultaneous lowering or adjustment of the printing cylinders or rollers we provide a hand lever *t* pivoted at *t'* and having a cam t^2, which cam acts on the lower horizontal lever *n* and raises the weighted end. It will be quite understood from the preceding description of the lever and link mechanism that the requisite levers and links are duplicated at the other end of the machine supported by the frame and connected across as necessary.

Instead of the above described arrangement, or in addition thereto, we may arrange to be able to raise or lower the backing bows *g*, *g'*. We show an obvious way of doing this according to which the backing bowls are carried in adjustable bearings g^x g'^x to which screwed spindles *u* *u* are fitted and which work in the frame. Said screwed spindles are actuated by bevel gear *v*, *v*, as indicated, and the two sets of gear may be interconnected so that adjustment of both bowls could take place simultaneously.

By directing the paper up and down, sagging does not take place, and correct "register" is insured.

The whole construction makes for extreme compactness and efficiency and the entire printing mechanism is localized at one point.

In case it is found that the ink can be dried very rapidly we may in some cases arrange to convey the paper after it has been printed by the first printing cylinder directly across to the second printing cylinder without requiring to take the paper around the drying cylinder as hereinbefore described.

We declare that what we claim is:

1. A duplex or perfecter photogravure or like printing machine comprising a single head, single end frames, two impression bowls located in the one head, adjusting means for the bowls, two printing cylinders in the one head and mounted below the bowls, lever and link mechanism to simultaneously move both printing cylinders, a paper supply source, guiding rollers for the paper, a stationary saddle, a drying cylinder arranged above the impression bowls, a water cooling cylinder arranged between the drying cylinder and the impression bowls, and a positive driving connection between the impression bowls.

2. A duplex or perfecter photogravure or like printing machine comprising a batch supporting means, draw rollers, a saddle, and guide rolls in combination with end frames supporting two impression bowls, printing cylinders below the bowls, sup-

ports therefor, adjusting devices for the cylinders comprising lever mechanism, a drying roller and additional guide rollers and a water cooled roller through which water is caused to flow, all in combination, and for the purpose set forth.

3. A duplex or perfecter photogravure or like printing machine comprising a single head, single end frames, two impression bowls supported by said end frames one above the other in relatively close relation, a positive drive connection between the bowls, two printing cylinders arranged one above the other for coöperation with the under surfaces of the impression bowls, means to movably support the cylinders, means for guiding the paper, and means for simultaneously adjusting both printing cylinders with relation to the impression bowls comprising a horizontal lever, a shaft on which the lever is fulcrumed, other levers having linked connection with the aforesaid shaft and also having operative connection with the lowermost printing cylinder supporting means, an operating lever to actuate the first mentioned lever to raise and lower the lowermost printing cylinder, and link and lever connections between the first mentioned lever and the supporting means of the uppermost printing cylinder, whereby upon actuation of the operating lever both of the printing cylinders may be raised and lowered toward and away from the under surfaces of the impression bowls.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JOHN WOOD.
WILLIAM ARMSTRONG.

Witnesses:
ERNALD SIMPSON MOSELEY,
NORMAN KIERNAN.

July 13, 1926. 1,592,806

L. W. BRUNELL

ART OF PRINTING

Filed June 16, 1924 2 Sheets-Sheet 2

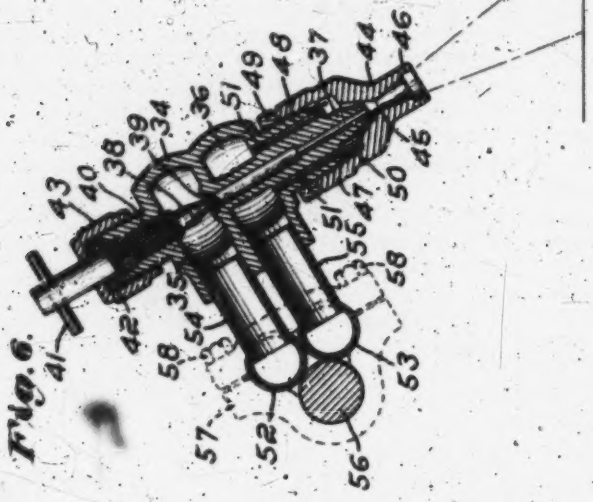


Fig. 6.

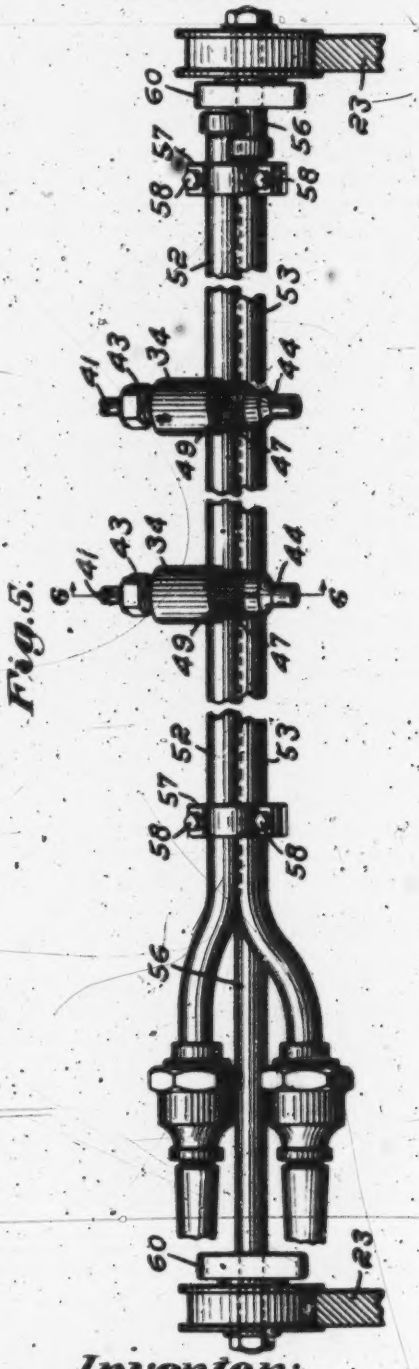


Fig. 5.

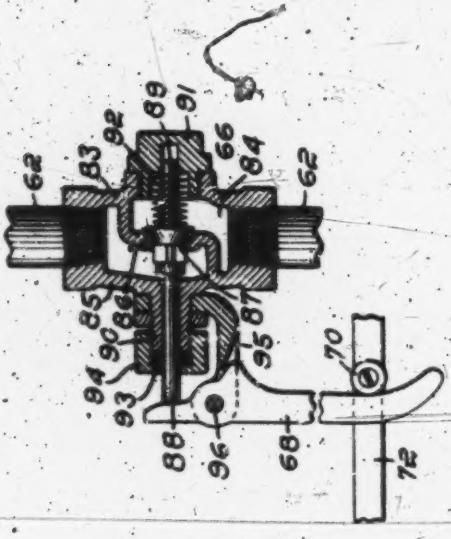


Fig. 4.

Inventor:
Leo W. Brunell,
by Emery Booth, Janney & Varney
Attys.

July 13, 1926. 1,592,806

L. W. BRUNELL

ART OF PRINTING

Filed June 16, 1924 2 Sheets-Sheet 1

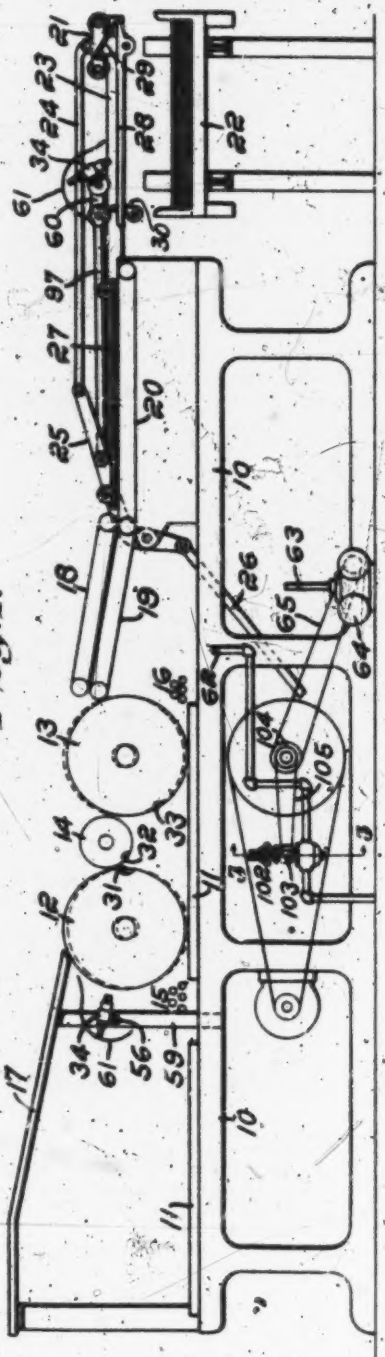


Fig. 1.

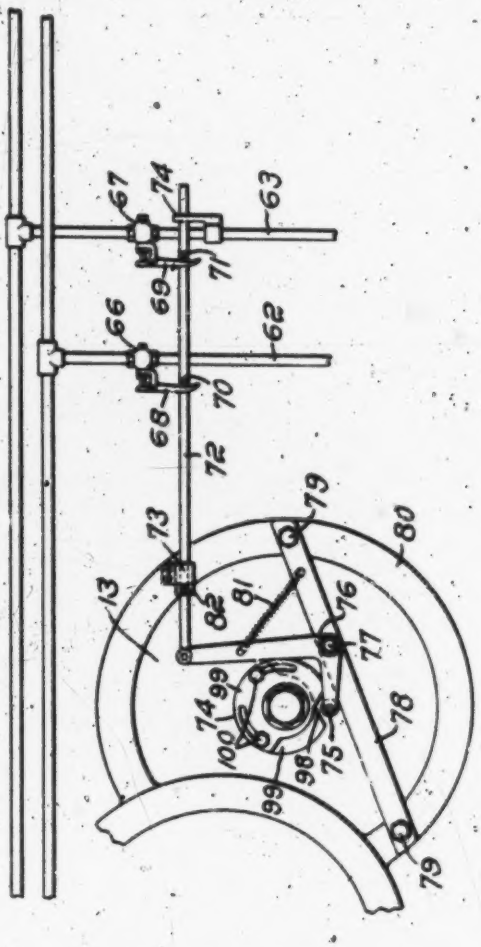


Fig. 2.

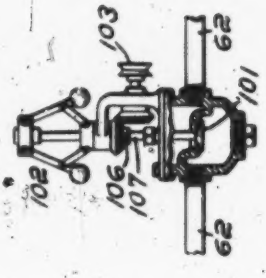


Fig. 3.

Inventor:
Leo W. Brunell,
by Emery, Booth, Janney & Varney
Attys.

Patented July 13, 1926. 1,592,806

UNITED STATES PATENT OFFICE.

LEO W. BRUNELL, OF FOXBORO, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO EDWARD W. CALKINS, OF ASHMONT, BOSTON, MASSACHUSETTS.

ART OF PRINTING.

Application filed June 16, 1924. Serial No. 720,149.

This invention relates to the art of printing, and aims to provide a novel and improved method of and means for treating freshly printed sheets to dry the same, and to eliminate static charge therefrom.

The invention will be best understood by reference to the following description, when taken in connection with the accompanying drawings of one specific embodiment by which the method may be carried out, while its scope will be more particularly pointed out in the appended claims.

In the drawings:

Fig. 1 is a skeletonized, conventional representation of a two-color printing press equipped with means for carrying out the method, some of the parts of my apparatus, however, being omitted for the sake of clearness, and because of the small scale of the view;

Fig. 2 is an elevation, on an enlarged scale, of the parts omitted from Fig. 1;

Fig. 3 is a sectional view on an enlarged scale on line 3—3 of Fig. 1, showing the fuel controlling valve which is responsive to the speed of the press;

Fig. 4 is a vertical, sectional view on an enlarged scale of the fuel controlling valve, which is synchronized with the press to furnish maximum and minimum amounts of fuel at different times in the cycle of the press;

Fig. 5 is a front elevation of some of the burners, their mounting, and the air and fuel supply conduits, on an enlarged scale; and

Fig. 6 is a sectional view, on an enlarged scale, on line 6—6 of Fig. 5.

Referring to the drawings, and to the embodiment of the invention which is selected for exemplification, there is shown a two-color press of common form, having a frame 10, a type bed 11, impression cylinders 12 and 13, a transfer cylinder 14, two sets of inking rollers 15 and 16, a feed table 17, and delivery mechanism including two sets of upper and lower feed tapes 18 and 19, another set of feed tapes 20, to which the tapes 18 and 19 deliver the sheets, and a reciprocating carriage 21, which receives the sheets from the tapes 20 and delivers them one by one onto a lowering table 22. The carriage is supported by rails 23, and is reciprocated by mechanism including links 24, levers 25, and links 26, the latter being actuated by a usual crank mechanism not shown. When the sheet is travelling along the tapes 20, it is guided by guides 27, which keep it flat, and it is taken from the tapes by supports 28 carried by the carriage, which also carries movable stops 29 for the front edge of the sheet. The rear edge is positioned by swinging arms 30, which are lowered at the moment that the sheet strikes the stops 29, and are raised afterward to prevent the sheet from travelling backward.

The sheets are fed one by one from the feed table 17 to the first impression cylinder, and the sheet is seized by grippers 31. The cylinder makes one full revolution to wrap the sheet about the cylinder, and then during the next revolution, when the leading edge of the sheet is adjacent the first set of color plates carried by the bed, the cylinder is lowered and the first impression is made. The sheet is then carried to and seized by grippers 32 carried by the transfer cylinder, and is carried to and seized by grippers 33 carried by the second impression cylinder. The second impression is then made by the lowering of the second cylinder to bring the sheet into contact with the second set of plates carried by the bed, after which the sheet is delivered to the tapes 18 and 19, whence it passes along the tapes 20 and onto the guides 28, which at that moment are positioned to receive the same. The forward movement of the sheet brings it against the stops 29, and the carriage starts forward, bringing the sheet into position above the lowering table 22. The arms 30 then swing into place, and prevent backward movement of the sheet during the backward movement of the carriage which now takes place, at which time the front stops 29 lift and allow the sheet to pass off the guides 28 onto the lowering table.

The present invention contemplates the use of flame directed onto the printed face of the sheet at one or more points during the travel through the press, thereby to dry, or more properly crystalize, the ink, and to eliminate static charge from the sheet. In the present example, flame is employed at two points, namely: first, at the first impression cylinder shortly following completion of the first impression, and second, as the sheet is being delivered onto the lowering

table. At each of these points, there are several burners, one of which is shown in Fig. 6. The burner in its preferred form comprises a casing 34, presenting an air inlet chamber 35 and a fuel inlet chamber 36. Communicating with the air inlet chamber is an air nozzle 37, to which air is supplied under the control of appropriate valve means, herein a needle valve 38 cooperating with a seat 39, and having a stem 40 threaded into the casing 34, the outer end of the stem presenting a handle 41. Leakage of air about the stem is prevented by a packing ring 42 and gland 43, the latter being adjustably threaded onto the casing 34. By means of this valve, the proportion of air to the fuel may be varied at will.

Associated with the air nozzle and in the present example disposed about the latter is a fuel nozzle 44, having a contracted throat 45 adjacent the outlet of the air nozzle 37. Outwardly beyond this throat, the outlet is widened, and terminates in an annular groove 46, which prevents the flame from being accidentally extinguished when it is burning at minimum intensity. Adjustment of the fuel supply nozzle to vary the fuel output may be effected by moving the same axially with relation to the air supply nozzle, this being conveniently accomplished in the present example by providing the fuel nozzle with a sleeve 47 threaded on and about a nipple 48 presented by the casing 34. A lock-nut 49, also threaded onto the nipple, serves to maintain the adjustment of the fuel nozzle. Inwardly beyond the throat 45, the fuel nozzle presents a chamber 50, to which fuel is supplied from the chamber 36 through one or more, herein a plurality of, passages 51, two of which are shown in Fig. 5. Thus it will be seen that by the use of these adjustments, the amount and the relative proportions of air and fuel may be varied at will. In practice, the burners are rather closely placed, so that the flames which they project form a continuous sheet of flame from one edge of the paper to the other.

Air and fuel are supplied to the burners by supply pipes 52 and 53, extending transversely of the press and having branches 54 and 55 (see Fig. 6) at intervals leading into the chambers 35 and 36, respectively. These supply pipes in the present example are supported on a transverse rod 56, to which they are appropriately secured, as by clamping collars 57 provided with clamping screws 58. By this means, the burners may be adjusted bodily, both longitudinally of and radially about the axis of the supporting rod, thereby to position the entire group of burners properly with relation to the edges of the paper, and to present the burners at the best angle to the surface of the paper. In the case of the burners associated with the first impression cylinder, the supporting rod is conveniently mounted on uprights 59 (see Fig. 1), while in the case of the burners adjacent the lowering table, the supporting rod is mounted on a carriage 60 (see Fig. 5), which runs on the same rails 23 which support the carriage 21. To conserve heat, there may be associated with each set of burners a shield or hood 61, whose internal surface may, if desired, be polished or otherwise treated to present a reflector.

The fuel, such as common illuminating gas, is supplied to the two sets of burners by a common supply pipe 62 (see Fig. 2), while the air is supplied to both sets of burners by a common supply pipe 63, the latter being connected to and supplied by a blower 64, appropriately driven by the press as by a chain or belt 65. While the blower might be driven by a separate source of power, it is preferred to have it driven by the press itself, so that when the press is stopped, the supply of air will cease, and the flame will therefore be reduced.

The gas and air supply pipes 62 and 63 are controlled by automatically operated valves 66 and 67, both of which are controlled by and operate in timed relation to the press, so as to produce a maximum flame at each set of burners, just as the sheet is passing by, and to produce a minimum flame when no sheet is passing. To this end, the valves are provided with actuating levers 68 and 69 cooperating with rollers 70 and 71 carried by an operating rod 72 extending longitudinally of the press, and mounted to slide in appropriate guides 73 and 74. This rod is operated by a suitable part of the press, such as the second impression cylinder 13, which, as shown in Fig. 2 carries a cam 74 cooperating with a wiper, herein a roller 75 carried by one arm of a lever 76, whose other arm is pivotally connected to the rod 72. This lever is conveniently fulcrumed on a pivot 77 on a bar 78, whose ends are secured, as by screws 79, to a usual gear casing or guard 80 for the gear (not shown), which drives the cylinder. A spring 81, herein attached at one end to the lever and at its other end to the supporting bar, constantly tends to maintain the roller in contact with the cam, and to move the rollers 70 and 71 out of engagement with their respective valve operating levers 68 and 69. In the case of the air controlling valve, it is desirable that the valve shall be completely closed when no sheet is travelling past the burners, and to that end, the roller 71, as shown in Fig. 2, at such time clears the lever 69, which it actuates. In the case of the gas valve, however, it is desirable that the same shall remain partly open, thereby to maintain a low flame, except at such times as a sheet is actually passing the burners.

One convenient way of accomplishing this is to provide the actuating rod 72 with a stop collar 82, adapted to engage the guide 73, and thus limit the movement of the rod toward the right, under the influence of the spring. In this way, the roller 70 carried by the rod, cooperating with the lever 68, prevents the gas valve from closing entirely.

One convenient form of valve for the gas and air supplies will now be described, reference being had to Fig. 4, which shows the gas valve. This valve comprises a casing 83, presenting inlet and outlet chambers 84 and 85, and an intervening seat 86 for a valve 87 having oppositely projecting stems 88 and 89, one guided by a threaded nipple 90 presented by the valve casing, and the other guided by a cap 91 threaded into the casing. A spring 92, encircling the stem 89 and bearing at one end against the valve and at its other end against the cap, tends to seat the valve, which however, as previously stated, is normally held slightly open. Leakage of gas about the stem 88 is prevented by a packing ring 93 and a gland 94, the latter being threaded onto the nipple 90, which also affords a convenient support for a bracket 95, on which the lever 68 is fulcrumed on a pivot 96. The air valve, being of the same construction, though normally entirely closed, is not shown in detail.

The operation of the machine as thus far described will be reviewed briefly, reference being had to Figs. 1 and 2. The sheet to be printed is fed from the feed board to the grippers of the first impression cylinder, which makes one full revolution to wrap the sheet about the cylinder, and then, during the next revolution, when the leading edge of the sheet is adjacent the first set of color plates, the cylinder is lowered to bring the sheet in contact with the plates, thus making the first impression. When the leading edge of the sheet reaches a point adjacent the first set of burners, the automatically operated valves cause air and gas to be supplied to operate the burners at maximum capacity. At this point, it may be mentioned that, with the particular press selected for illustration, it happens that a sheet is being carried past the second set, and it follows that a single set of controls suffices for both sets of valves.

While the flames are of sufficient intensity to ignite the sheets if the latter were not moved at a sufficient speed, yet the surface speed of an ordinary press is ample to prevent the sheet from being scorched ever so slightly, although the heat from the flame is so intense that long after the sheet has reached the lowering table, it is too hot for one's hand to rest upon with comfort. This intense heat dries, or more properly speaking, crystalizes the ink, and at the same time eliminates static which heretofore has been a troublesome factor. Owing to the drying action, the printer is enabled to adjust the ink fountain to supply a full body of ink without serious danger of smutching, commonly called offsetting.

To resume the operation, the sheet is next taken by the grippers of the transfer cylinder, and is immediately transferred to the grippers of the second impression cylinder, by which it is brought into contact with the second set of plates carried by the bed, after which the sheet is stripped from the cylinder, and passes first between the tapes 18 and 19, and then between the tapes 20 and guides 27. The carriage 21 being in its rearward position, the tapes 20 propel the sheet into engagement with the front stops 29, and the carriage then starts forward. At this instant, the automatic valves open fully, and air and gas are supplied to the second set of burners to cause a flame of maximum intensity to be directed onto the sheet just at the point where it leaves the tapes 20.

While these burners might remain stationary, yet in a press having a surface speed of, say, one hundred seventy feet per minute, it is desirable to move the burners forward at a lower speed than that of the sheet, so that the actual relative surface speed of the sheet is the difference between that of the sheet and that of the burners. An actual surface speed, possibly as low as fifty feet per minute, can be maintained with safety and without danger of burning, or even scorching, the sheet. Of course, the lower the surface speed the greater will be the heating of the sheet, and the consequent drying effect. In the present example, the carriage 60 for the second set of burners is connected by links 97 to the levers 25 about midway between the fulcrums of the levers and the pivoted connections of the links 24 which reciprocate the carriage 21. It follows that the actual relative surface speed of the burners and sheets is about half that of the sheet.

In the present example, the sheet carriage 21 travels forward only far enough to deposit the sheet on the lowering table 22,—hence it follows that the burner carriage 60 must not go forward a distance equal to the travel of the sheet carriage 21,—otherwise, they would collide. In this embodiment, therefore, the burner carriage is caused to reverse its movement after the burners have traversed a part only of the sheet (see Fig. 1). However, the remaining surface of the sheet is thus traversed by the burners during their rearward movement, and of course, inasmuch as the sheet is now stationary, the relative surface speed of the burners to the sheet is the same as before. When a crank is used to supply the necesary motion of the burner carriage, the latter is moving

very slowly for a short time, as its direction is reversed. In case this slowing down should tend to scorch the sheet, the form of the cam 74 may be such as to reduce the flame for an instant, as by providing the cam path with a drop or indentation 98, which allows the spring 81 to assert itself to operate the valves as before described.

As sheets of various dimensions are printed in the same press, provision is made to vary the duration of the maximum flame, so that it shall be maximum only during the traversing of the burners by the sheet. This is conveniently accomplished in the present example by making the depression in the cam adjustable, as by making the cam in two relatively adjustable parts 99, one of which is slotted to receive clamping screws 100 threaded into the other part, so that by simply lowering these screws, turning one part relatively to the other, and then tightening the screws, the cam may be caused to furnish the desired duration of maximum flame. It will be remembered that in the present example, the cam is carried by a vertically movable impression cylinder. This being so, it is evident that provision should be made to compensate for this movement,—otherwise, it would affect the operation of the burners. This compensation is conveniently accomplished, herein, by mounting the cam eccentrically with relation to the cylinder (see Fig. 2) by an amount equal to the vertical travel of the cylinder, the effect being to keep the cam path in the same position which it would occupy if the cam were concentric with a vertically stationary cylinder.

When the press, for any reason, slows down or stops, the blower, being driven by the press, correspondingly slows down or stops, and correspondingly reduces or stops the forced air supply to the burners. When this happens, in the case of the burners on the carriage 60, the flames simply flicker in an upward direction, owing to the absence of the air blast, and do no harm, but in the case of the burners adjacent the first impression cylinder, reduction or stoppage of the air blast is insufficient to keep the flames from burning the sheet. To take care of this condition, I have provided a gas valve 101 (see Fig. 3), which is responsive to the speed of the press as by the use of a speed-responsive device such as a centrifugal governor 102, of common form, suitably driven by the press, as by pulleys 103 and 104, and a belt 105. This valve, like the valve 66, is provided with means for preventing it from closing entirely, it being provided, for this purpose, with a stop collar 106 secured to a spindle 107, which constitutes the stem of the valve, as well as the shaft of the governor.

The general operation should be evident from the foregoing without further description, except to emphasize the fact that the controls of the air blast and gas are such as to furnish maximum and minimum heat at the proper times, thus not only avoiding any possibility of setting fire to the printed sheet or to the tympan sheet, but also effecting a marked economy in the use of gas.

Having thus described one embodiment of the invention, and one means for carrying out the method, but without limiting myself thereto, what I claim and desire by Letters Patent to secure is:

1. The method of treating a freshly printed sheet, characterized by directing flame at the moist ink while imparting a relative movement to the sheet and flame to cause the printed surface to be traversed by the flame.

2. In a printing press, the combination of means for printing the sheet, means for producing a flame and directing the same onto the printed surface of the sheet, and means for causing a relative movement of the sheet and the flame to prevent ignition of the sheet.

3. The combination with a printing press, of a burner for producing a flame to which the printed face of the sheet is exposed during its travel, means operated by the press for causing a periodic reduction of the flame while the press is running, and means operated by said press for reducing said flame when said press stops.

4. The combination with a printing press, comprising reciprocating sheet-feeding means having a sheet-feeding movement and a non-feeding movement, of a burner for producing a flame to which the printed face of the sheet is exposed during its travel, and means for causing reduction of said flame during the non-feeding movement of said sheet-feeding means.

5. The combination with a printing press comprising reciprocating sheet-feeding means having a sheet-feeding movement and a non-feeding movement, of a burner, means for supplying said burner with air and fuel, and means for causing a cessation of the supply of air and a reduction of the supply of fuel during the non-feeding movement of said sheet-feeding means.

6. The combination with a printing press comprising reciprocating sheet feeding means having a sheet-feeding movement and a non-feeding movement, of a burner, means for supplying said burner with air and fuel, an air-controlling valve, a fuel-controlling valve, and means operated by said press, for causing said valves to open for the sheet-feeding movement and to move toward their closed positions for the non-feeding movement of said sheet-feeding means.

7. In a printing press, the combination of sheet-feeding means, means for subject-

ing the printed sheet to the action of flame while the sheet is being moved, means responsive to the speed of the press for controlling the flame, and means for causing reduction of the flame during idle movement of said sheet-feeding means.

8. In a printing press, the combination of sheet-feeding means, means for subjecting the printed sheet to the action of flame while the sheet is being moved, means for causing reduction of the flame during idle movement of said sheet-feeding means, and means for causing reduction of the flame when the press stops.

9. In a printing press, the combination of sheet feeding means, means for subjecting the printed sheet to the action of flame while the sheet is being moved, means for causing the flame to burn with maximum intensity during feeding movement of said sheet feeding means and to burn with less intensity during non-feeding movement of said feeding means, and means for causing the flame to diminish as the speed of the press diminishes and to burn at minimum intensity when the press stops.

10. In a printing press, the combination of sheet-feeding means, a heater for subjecting the sheet to the action of heat, and means for causing said heater to travel along the sheet in the same direction but at a speed lower than that of the sheet.

11. In a printing press, the combination of sheet-feeding means, a heater for subjecting the sheet to the action of heat, and means to cause said heater to travel along the moving sheet in the same direction at a lower speed than that of the sheet and to travel along the sheet in the opposite direction during inaction of the sheet.

12. In a printing press, the combination of reciprocating sheet-feeding means which feeds the sheet in one direction and has an idle movement in the opposite direction, a heater for subjecting the sheet to the action of heat, and reciprocating heater moving means to cause said heater to travel along the travelling sheet in the same direction at a lower speed than that of the sheet, and to travel along the sheet in the opposite direction during the idle movement of said sheet-feeding means.

13. In a printing press, the combination of a heater for subjecting the sheet to the action of heat, means for producing relative movement of said heater and the sheet to cause said heater to traverse the sheet part way across the latter and for producing movement of said heater in the opposite direction to cause said heater to traverse the remainder of the sheet, and means for causing temporary reduction of the heat produced by said heater during reversal of movement of said heater.

14. In a printing press, the combination of a heater for subjecting the sheet to the action of heat, means for producing relative movement of said heater and the sheet to cause one to traverse the other, and heater controlling instrumentalities including means of adjustment to sheets of different widths to cause a certain heating effect of said heater during different predetermined portions of said movement corresponding to the widths of sheets and to cause a lesser heating effect of said heater during other predetermined portions of said movement.

15. In a printing press, the combination of a heater for subjecting the sheet to the action of heat, means for producing relative movement of said heater and the sheet to cause one to traverse the other, and heater controlling instrumentalities including a cam having means of adjustment to sheets of different widths to cause a certain heating effect of said heater during different predetermined portions of said movement corresponding to the widths of sheets and to cause a lesser heating effect of said heater during other predetermined portions of said movement.

In testimony whereof, I have signed my name to this specification.

LEO W. BRUNELL.

April 3, 1928. 1,665,185

L. W. BRUNELL

MEANS FOR TREATING SHEET MATERIAL WITH HEAT

Filed March 19, 1927 4 Sheets-Sheet 1

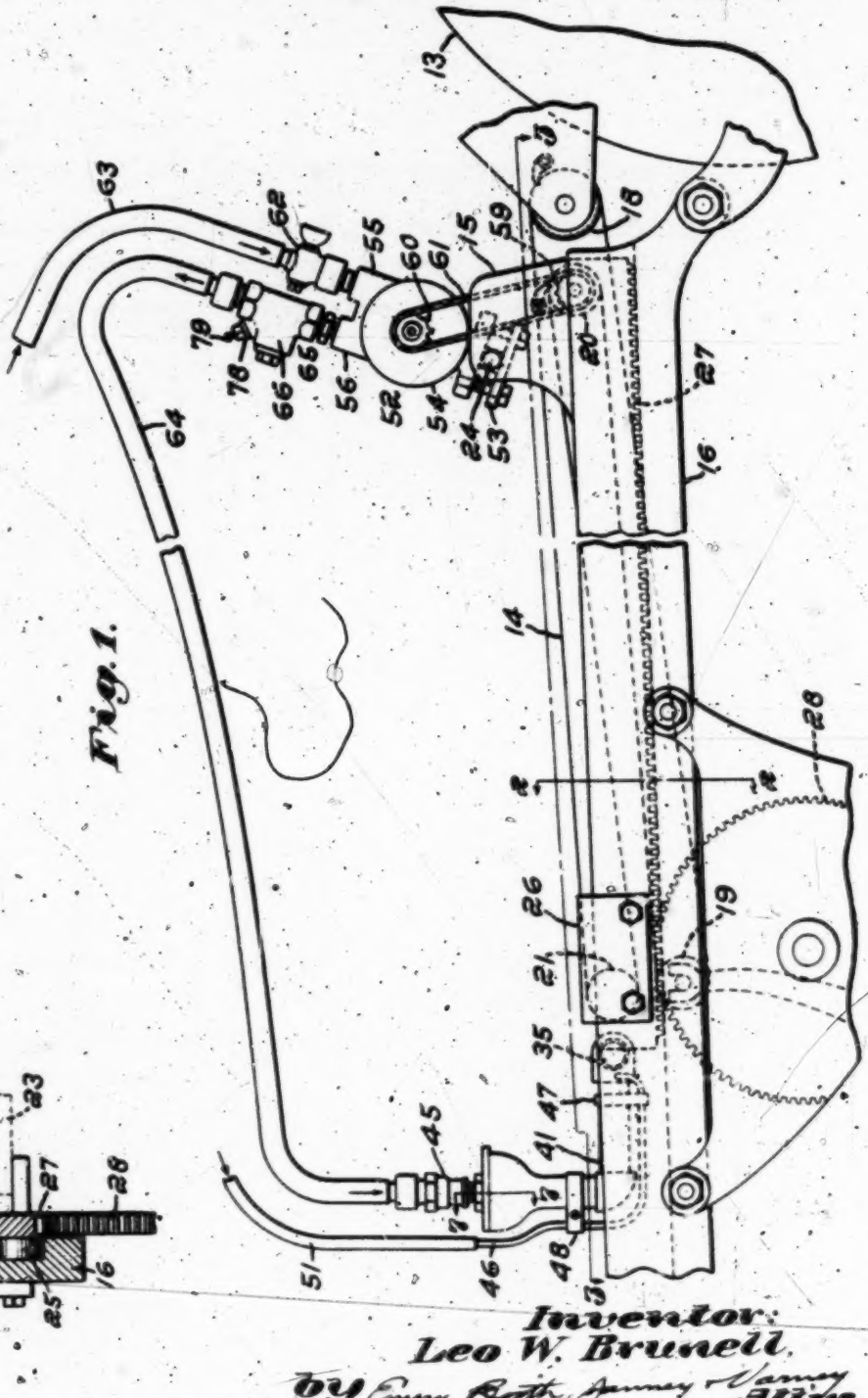


Fig. 1.

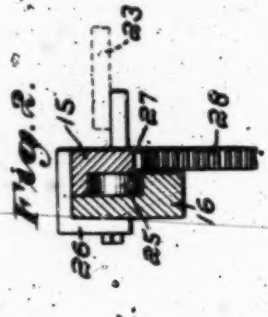


Fig. 2.

Inventor:
Leo W. Brunell,
by Emery, Booth, Janney & Varney
Attys.

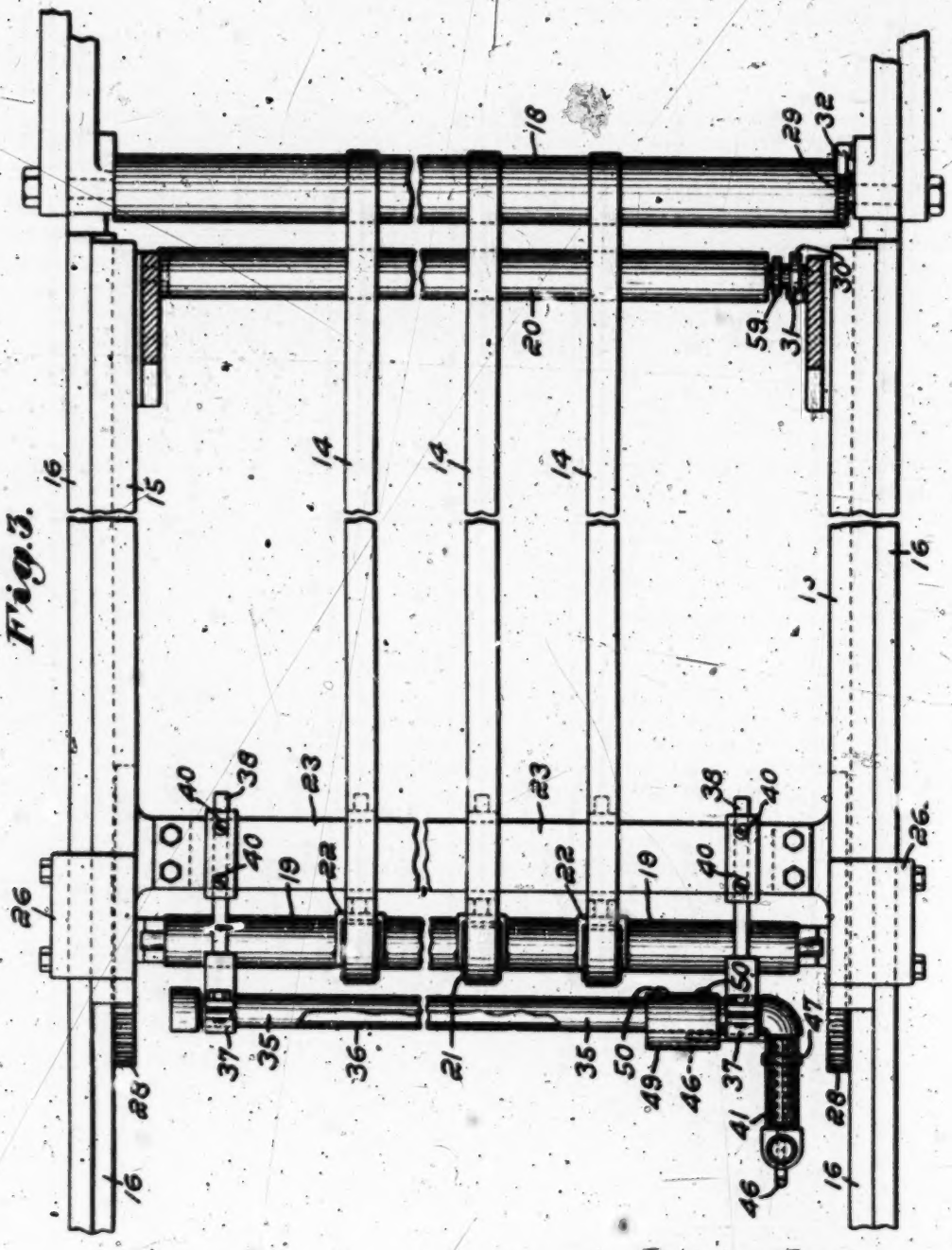
April 3, 1928. 1,665,185

L. W. BRUNELL

MEANS FOR TREATING SHEET MATERIAL WITH HEAT

Filed March 19, 1927 4 Sheets-Sheet 2

Fig. 3.



Inventor:
Leo W. Brunell.
by Emery, Booth, Janney & Varney
Attys.

April 3, 1928. 1,665,185

L. W. BRUNELL

MEANS FOR TREATING SHEET MATERIAL WITH HEAT

Filed March 19, 1927 4 Sheets-Sheet 3

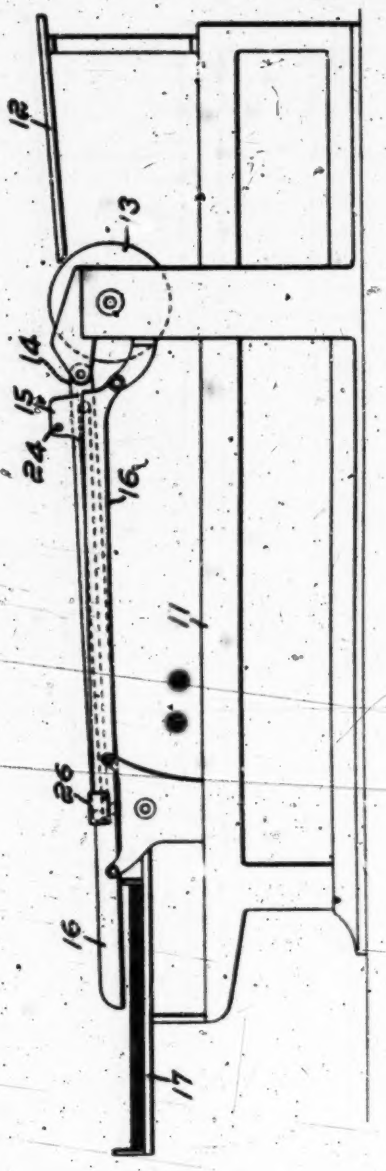


Fig. 4.

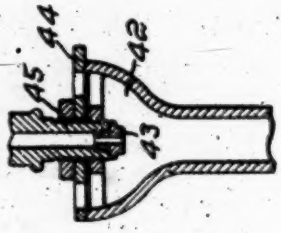


Fig. 2.

Fig. 6.

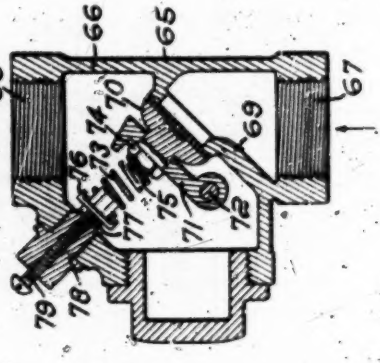


Fig. 5.

Inventor:
Leo W. Brunell
By Emery, Booth, Varney & Varney
Attys.

April 3, 1928. 1,665,185

L. W. BRUNELL

MEANS FOR TREATING SHEET MATERIAL WITH HEAT

Filed March 19, 1927 4 Sheets-Sheet 4

Fig. 8.

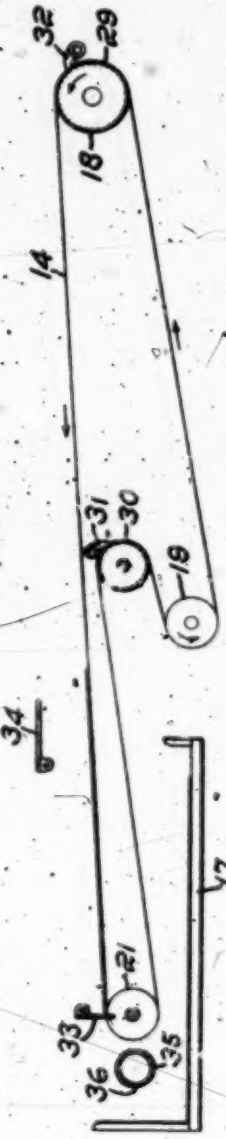


Fig. 9.

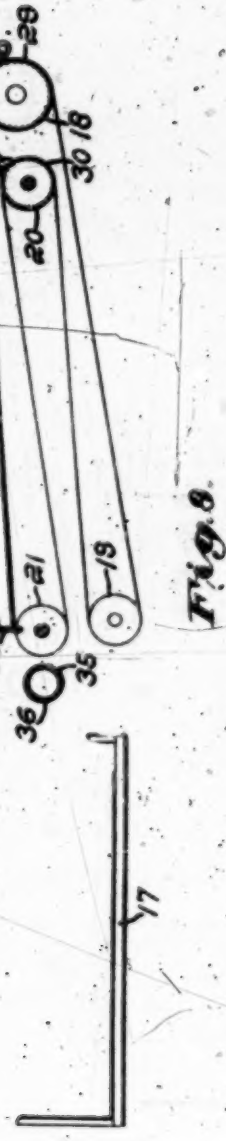
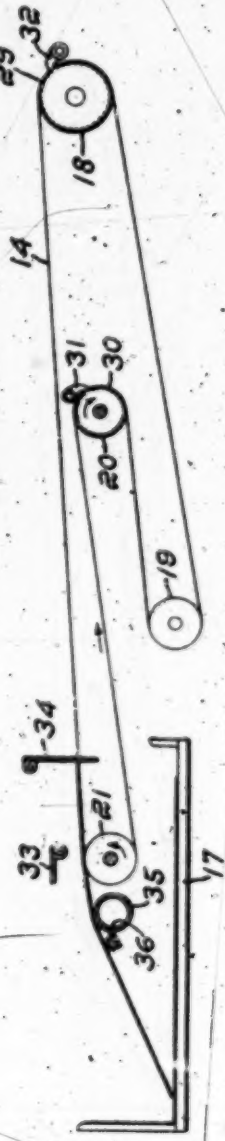


Fig. 10.



Inventor:
Leo W. Brunell.
By Emery, Booth, Janney & Varney
Attys.

Patented Apr. 3, 1928. 1,665,185

UNITED STATES PATENT OFFICE.

LEO W. BRUNELL, OF FOXBORO, MASSACHUSETTS, ASSIGNOR OF ONE-THIRD TO BURT F. UPHAM AND ONE-THIRD TO EDWARD W. CALKINS, BOTH OF BOSTON, MASSACHUSETTS.

MEANS FOR TREATING SHEET MATERIAL WITH HEAT.

Application filed March 19, 1927. Serial No. 176,633.

This invention relates to novel means for treating sheet material, such as paper, with heat furnished by a gas burner, between which and the paper there is a relative movement. The invention is particularly useful in connection with the drying of ink and the neutralizing of static charges on paper passing through or from a printing press.

The invention will be best understood by reference to the following description, when taken in connection with the accompanying drawings of one specific embodiment thereof, while its scope will be more particularly pointed out in the appended claims.

In the drawings:

Fig. 1 is a side elevation of a portion of a printing press equipped with heat treating means exemplifying the invention;

Fig. 2 is a sectional view, on line 2—2 of Fig. 1;

Fig. 3 is a horizontal, sectional view, on line 3—3 of Fig. 1;

Fig. 4 is a somewhat conventional illustration of the entire press in side elevation, simply to show the general arrangement of the press, but omitting the novel features of the invention;

Fig. 5 is a vertical, sectional view of the valve, which, in conjunction with a pump, controls the flow of gas to the burner;

Fig. 6 is a vertical, sectional view of the pump;

Fig. 7 is a sectional view, on an enlarged scale, on line 7—7 of Fig. 1, illustrating the means for mixing gas and air to be supplied to the burner; and

Figs. 8, 9 and 10, are diagrammatic views illustrating the operation of the sheet-feeding means, in connection with the burner.

Referring to the drawings, and to the embodiment of the invention which is selected for exemplification, there is shown in Fig. 4 one type of press, in connection with which the invention may be used. The press includes the main frame 11, a feed table 12, a cylinder 13, a set of feed tapes 14, which receive the sheets one by one from the cylinder, and a reciprocating carriage 15, which travels on rails 16 and causes the tapes to deposit the sheets one by one on a jogger 17.

The mechanism for controlling the operation of the tapes will now be described, reference being had at first to Fig. 8. Each tape is an endless band, which extends part way around each of a set of rollers 18, 19, 20 and 21. The rollers 18 and 19 are mounted on the press frame (see Fig. 3), while the rollers 20 and 21 are mounted on the carriage. There are individual rollers 21, one for each tape, and each of these rollers is carried by a bracket 22 secured to a transverse tie-piece 23, which is a part of the carriage 15. At the other end of the carriage, there is another tie-rod 24 (see Fig. 1) connecting the two sides of the carriage. The carriage is equipped with rollers 25 (see Fig. 2), which run on the rails 16, respectively. Brackets 26, secured to the rails, and overlying the sides of the carriage (see Fig. 2), prevent the carriage from being lifted. The carriage is reciprocated by mechanism including racks 27 on the under side of the carriage, and meshing with gears 28.

As herein shown, the reciprocating movement of the carriage is utilized to impart an intermittent movement to the tapes, the arrangement being such that that portion of the tapes on which the sheet rests (see Figs. 8, 9 and 10) moves forward with the carriage, and at the same speed, whereas during the backward movement of the carriage, the tapes remain stationary. This is conveniently accomplished by providing two ratchets 29 and 30 (see Fig. 8), one secured to the roller 18 and the other to the roller 20, and cooperating with these ratchets are pawls 31 and 32, respectively. As clearly shown in Fig. 8, one ratchet and its associated pawl is so arranged that it is active, while the other is inactive. Furthermore, the pawls and ratchets are so arranged that, during the forward movement of the carriage from the position shown in Fig. 8, to and beyond the position shown in Fig. 9, the pawl 31 does not permit the ratchet 30 and roller 20 to rotate, whereas the pawl 32 permits the ratchet 29 and roller 18 to rotate contra-clockwise, as shown in Fig. 9. Accordingly, during the forward movement of the carriage, the upper part of the tape which sustains the sheet travels forward with the carriage, and at the same speed. On the other hand, during the backward travel of the carriage, as illustrated in Fig. 10, the pawl 32 now holds the ratchet 29 and roller 18 against rotation, and the pawl 31 permits rotation of the ratchet 30 and

Defendant's Exhibit P-2.

INTERCHEMICAL CORPORATION
75 Varick Street, New York City

July 22, 1941.

Messrs. Nims & Verdi,
60 East 42nd Street,
New York, N. Y.

Dear Sirs:

This will acknowledge receipt of your letter of July 18, 1941, with reference to our letter of July 9, 1941, to your client, Sinclair Carroll Co., Inc.

While our letter to your client relates to any inks which your client is manufacturing or selling which infringe our U. S. Letters Patent No. 2,087,190, we refer more particularly to inks which are designed to be set by the application of heat and which are sold to publication printers for use on rotary presses equipped with heating units.

Very truly yours,

INTERCHEMICAL CORPORATION,

By H. B. WOODMAN,
Vice-President.

HBW:F

Defendant's Exhibit Q-2.

Doughty U. S. Patent No. 1,439,695.

(Opposite ☞)

Patented Dec. 26, 1922. 1,439,695

UNITED STATES PATENT OFFICE.

HOWARD WATERS DOUGHTY, OF AMHERST, MASSACHUSETTS, ASSIGNOR TO ALCHEMIC GOLD COMPANY, INC., A CORPORATION OF NEW YORK.

INK.

No Drawing. Application filed May 8, 1922. Serial No. 559,419.

To all whom it may concern:

Be it known that I, HOWARD WATERS DOUGHTY, a citizen of the United States, residing at Amherst, in the county of Hampshire, State of Massachusetts, have invented certain new and useful Improvements in Inks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to inks and vehicles therefor, and particularly to metallic pigment inks suitable for use in stamping titles and decorative designs on book bindings and for other purposes to which the ink may be adapted.

In stamping titles in gold, for example, on books, labels and like materials, it has been the practice heretofore to employ gold or imitation gold leaf. The leaf is applied manually after the surface of the material has been treated with size, and the surplus leaf must be removed after stamping. Several operations are thus involved and the application of leaf in the manner described is consequently expensive. The use of artificial leaf effects a saving only in the cost of the leaf. Artificial leaf is, moreover, unsatisfactory because of the inferior quality of the work which quickly tarnishes when exposed to the effect of the atmosphere.

The use of metallic pigment inks has been suggested heretofore as a substitute for metallic leaf in stamping operations. No suitable inks have been available, however, and it has been impossible to produce satisfactory work therewith. A difficulty which has prevented the use of metallic pigment inks is due to vehicles which dry too rapidly on the inking rolls, covering them generally with a gummy coating which prevents transfer of the ink to the type or die. In avoiding this extreme it is necessary to provide an ink which when once applied will dry rapidly.

It is the object of the invention, therefore, to provide an ink and an ink vehicle having the necessary properties, among others comparative slowness in drying without a tendency to become gummy, a consistency permitting transference of the ink through inking rolls to the type or die, rapid drying when applied to the work, and ability to protect the pigment from oxidation and consequent discoloration.

I have discovered that these desirable properties may be imparted to the ink by the use of a suitable medium in the vehicle for the pigment and that such a medium will, moreover, permit rapid drying of the ink by the application of heat to the type or die. The medium should be volatile, i. e., capable of being vaporized without carbonization, but its boiling point should be relatively high to reduce vaporization at atmospheric temperatures, and consequently to prevent rapid drying on the inking rolls. The medium must, moreover, be a solvent for the body of the vehicle. Preferably the boiling point of the selected medium should be between 200° and 300° C., a boiling point lower than 250° C. being desirable. Solvents boiling materially below 200° C. are unsuitable because the ink dries too rapidly on the rolls and becomes gummy. Solvents boiling materially above 300° C. are likewise unsuitable because the ink cannot be successfully dried except by the application of impracticably high temperatures. A suitable medium may be found in the derivaties of the terpene series of hydrocarbon compounds, the alcohols, of which terpineol is an example, being admirably adapted for the purpose. Terpineol is capable of imparting the desired properties to the vehicle in a marked degree, and is at the same time readily available in commerce and relatively inexpensive. Other suitable solvents are benzyl alcohol and certain esters of aromatic acids such as terpinyl acetate, benzyl acetate and ethyl benzoate. Oil of dammar resin is also a suitable solvent, this and the other solvents mentioned having the distinguishing characteristics above referred to.

In carrying out the invention the solvent is combined with a thickening agent forming the body of the vehicle. Preferably a resinous material such as colophony (ordinary rosin), dammar, copal, Burgundy pitch or Canada balsam, is dissolved in the solvent to produce a vehicle of the desired consistency. A proportion of benzoin may be added with advantage to the composition, replacing a

portion of the other resinous material, or benzoin may be substituted for either of the resins mentioned, which, of course, may be mixed or combined in any desired proportions, although for commercial reasons it is preferred to employ colophony alone as a resinous ingredient of the composition. The pigment, preferably a bronze or other metallic powder of the desired color, is thoroughly incorporated with the vehicle to complete the ink.

It is to be understood that equivalents of the terpineol, benzyl alcohol or other solvent may be substituted therefor and that materials naturally containing these solvents may be employed. Artificial mixtures containing the solvents mentioned may be used also. Natural or artificial mixtures of the solvent should have a minimum boiling point of substantially 200° C. to avoid too rapid drying of the ink upon the rolls.

The bronze or other metallic powder used may be the ordinary article of commerce and may consist, for example, of an alloy of copper with other metal or metals adapted to impart the desired color to the alloy. The alloy is reduced to a state of fine subdivision in the usual manner. Metallic powders containing metals other than copper can be used.

As an example of the application of the invention, the vehicle may comprise four parts of the solvent, benzyl alcohol for example, to one part of ordinary rosin. Preferably the benzyl alcohol is heated to a temperature ranging from 100° to 130° C. and is maintained at that temperature while the rosin is dissolved therein. The proportions of resin and solvent may be varied within the limits necessary to produce a vehicle of the proper viscosity. The vehicle and metallic powder are thoroughly mixed preferably in the proportions of two parts of the powder to one part of the vehicle.

The ink produced as described may be applied by means of the usual ink fountain or table to the inking rollers and thence transferred to the type or die. Drying of the ink on the rollers, a fault which has characterized inks heretofore suggested, is avoided. The ink dries very slowly at atmospheric temperature owing to the high boiling point of the volatile solvent. It dries rapidly, however, when applied with a heated die. The impression is highly glossed and the vehicle forms a lacquer which protects the pigment from tarnishing, thus providing a permanent and highly satisfactory title or decoration on book bindings and the like. The color will depend upon the particular pigment employed which may be other than metallic in character.

The ink described, though particularly suitable for book-binders' use, will serve other purposes of decorative printing. It is adapted to materially reduce the cost of such printing because of the low cost of the ink and the simplicity of its application.

Various changes may be made in the details of the invention without departing therefrom or sacrificing any of the advantages thereof.

I claim:

1. An ink having a metallic pigment and a vehicle comprising a resinous substance and a volatile solvent therefor, the boiling point of which is not materially lower than 200° C.

2. An ink having a metallic pigment and a vehicle comprising a resinous substance and a volatile solvent therefor with a boiling point between 200° and 300° C.

3. An ink having a metallic pigment and a vehicle comprising a resinous substance and a volatile solvent therefor with a boiling point between 200° and 250° C.

4. An ink having a metallic pigment and a vehicle comprising ordinary rosin and a volatile solvent therefor, the boiling point of which is not materially lower than 200° C.

5. An ink having a metallic pigment and a vehicle comprising ordinary rosin and a volatile solvent therefor with a boiling point between 200° and 300° C.

6. An ink having a metallic pigment and a vehicle comprising ordinary rosin and a volatile solvent therefor with a boiling point between 200° and 250° C.

7. An ink having a metallic pigment and a vehicle comprising a resinous substance and benzyl alcohol as a solvent therefor.

8. An ink having a metallic pigment and a vehicle comprising a resinous substance and a solvent therefor containing benzyl alcohol.

9. An ink having a metallic pigment and a vehicle comprising a solvent containing benzyl alcohol and a thickening agent dissolved therein.

10. An ink having a metallic pigment and a vehicle comprising a solvent, the boiling point of which is not materially lower than 200° C. and a thickening agent dissolved therein.

11. An ink having a metallic pigment and a vehicle comprising a solvent with a boiling point between 200° and 300° C. and a thickening agent dissolved therein.

12. An ink having a metallic pigment and a vehicle comprising a solvent with a boiling point between 200° and 250° C. and a thickening agent dissolved therein.

13. In an ink a vehicle comprising a resinous substance and a volatile solvent therefor, the boiling point of which is not materially lower than 200° C.

14. In an ink a vehicle comprising a

resinous substance and a volatile solvent therefor with a boiling point between 200° and 300° C.

15. In an ink a vehicle comprising a resinous substance and a volatile solvent therefor with a boiling point between 200° and 250° C.

16. In an ink a vehicle comprising ordinary rosin and a volatile solvent therefor, the boiling point of which is not materially lower than 200° C.

17. In an ink a vehicle comprising a resinous substance and benzyl alcohol as a solvent therefor.

18. In an ink a vehicle comprising a resinous substance and a solvent therefor containing benzyl alcohol.

19. In an ink a vehicle comprising a solvent containing benzyl alcohol and a thickening agent dissolved therein.

20. In an ink a vehicle comprising a solvent containing benzyl alcohol and ordinary rosin dissolved therein.

21. In an ink a vehicle comprising ordinary rosin and benzyl alcohol as a solvent therefor.

22. In an ink a vehicle comprising a solvent, the boiling point of which is not materially lower than 200° C. and a thickening agent dissolved therein.

23. In an ink a vehicle comprising a solvent with a boiling point between 200° and 300° C. and a thickening agent dissolved therein.

24. In an ink a vehicle comprising a solvent with a boiling point between 200° and 250° C. and a thickening agent dissolved therein.

In testimony whereof I affix my signature.

HOWARD WATERS DOUGHTY.

Defendant's Exhibit T-2.

COPY

Liber A158 Page 182

Assignment.

WHEREAS, ALCHEMIC GOLD COMPANY, INC., a New York corporation, is the owner of the entire right, title and interest in and to certain Letters Patent of the United States pertaining to inks and ink vehicles, to wit:

Howard Waters Doughty, No. 1,439,695, Dec. 26, 1922
" " " " 1,439,696, Dec. 26, 1922
" " " " 1,607,730, Nov. 23, 1926

and

WHEREAS FRED'K H. LEVEY CO., INC., a New York corporation, is desirous of securing the entire right, title and interest in and to said Letters Patent, subject to the conditions as hereinafter set forth:

NOW, THEREFORE, in consideration of Fifteen Dollars ($15.00) in hand paid and other valuable considerations, receipt whereof is hereby acknowledged, said ALCHEMIC GOLD COMPANY, INC., has sold and assigned, and by these presents does hereby sell and assign to said FRED'K H. LEVEY CO., INC., its successors and assigns, the entire right, title and interest in and to said Letters Patent No. 1,439,695, No. 1,439,696 and No. 1,607,730, including reissues and extensions thereof, reserving, however, to said ALCHEMIC GOLD COMPANY, INC., its successors, assigns and sub-licensees, the exclusive right and license to manufacture, sell and use inks and vehicles for inks which are employed in stamping as distinguished from letterpress, offset, lithographic and intaglio printing, said Letters Patent and all rights thereunder being otherwise to be enjoyed exclusively by

said FRED'K H. LEVEY CO., INC., its successors and assigns, to the full end of the terms of said Letters Patent.

AND, said ALCHEMIC GOLD COMPANY, INC., also grants to said FRED'K H. LEVEY CO., INC., its successors and assigns, the right to sue for and collect any and all claims, demands and choses in action of any nature whatsoever in law or in equity which said ALCHEMIC GOLD COMPANY, INC., has or may have arising from or growing out of the infringement at any time prior to the date hereof, upon any of said Letters Patent, except in so far as such infringement relates to the exclusive right and license to manufacture, sell and use inks and vehicles for inks as specifically reserved herein to ALCHEMIC GOLD COMPANY, INC., its successors, assigns, and sub-licensees.

IN WITNESS WHEREOF, said ALCHEMIC GOLD COMPANY, INC., has caused this assignment to be executed by its duly authorized officers for and on its behalf.

ALCHEMIC GOLD COMPANY, INC.

By SIDNEY SATENSTEIN /s/
President

Defendant's Exhibit T-2.

STATE OF NEW YORK }
COUNTY OF NEW YORK } ss:

(SEAL)

On this 10th day of November, 1933, before me personally appeared SIDNEY SATENSTEIN, to me known, who, being by me duly sworn, did depose and say that he resides in the State of New York and that he is the President of ALCHEMIC GOLD COMPANY, INC., the corporation described in and which executed the foregoing instrument; that he knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by the order of the Board of Directors of said corporation; and that he signed his name thereto by like order.

WITNESS my hand and Notarial seal this 10th day of November, 1933.

CAROLINE R. STIGLMAYER /s/
Notary Public

Notary Public, Westchester Co.
Cert. filed West. Co. Register
N. Y. Co. Clerk's No. 33, Reg. No.
Commission expires Mar. 30, 19

(SEAL)

RECORDED
TRANSFERS OF PATENTS
U. S. PATENT OFFICE
NOV. 11, 1933
LIBER A158 PAGE 182
CONWAY P. COE,
Commissioner of Patents

Memorandum.

This suit involves the validity of Letters Patent No. 2,087,190, granted July 13, 1937, to the International Printing Ink Corporation, New York—an Ohio corporation—the name of which has since been changed to the Interchemical Corporation, the plaintiff herein.

The original inventor and patentee is Albert E. Gessler. The patent was applied for July 14, 1932, renewed April 11, 1936, and finally issued July 13, 1937. According to the patent his invention relates to printing inks, and has for its object the preparation of a novel type of printing ink claimed to possess many advantages over the printing inks theretofore known, and overcoming many of the disadvantages associated with the procedure which it has been necessary to use in order that such inks may be properly applied to produce a satisfactory print.

It is claimed the ink described in the patent has introduced a rather revolutionary change in the very old art of printing. Before this patent it seems printing inks have often been made by grinding pigments in oil or oil varnishes, or both, and had been characterized by their relatively slow rate of drying, depending upon polymerization, oxidation and/or absorption, and as a result have experienced great difficulty in the printing process by greatly delaying the speed of operation. This necessitated the maintenance of large and cumbersome auxiliary equipment and extra labor at great expense, and also a dependence of the printing process upon the time required to obtain a complete drying.

Ordinarily printing has been done by spreading a thin ink film on a series of rollers and then taking the ink from the rollers onto raised type, or cuts, and pressing those against the paper. To do this successfully it was necessary the ink be rather thick, of the consistency of molasses. These inks have been made out of drying oils, principally linseed oil, with which the pigment was mixed. Linseed oil is what is known as a drying oil, in that it

gradually hardens when exposed to the air, due to its absorption of oxygen from the air and changing its state. This drying ordinarily takes a day—and even by the use of so-called dryers; that is chemicals to hasten its absorption of oxygen, it formerly took at the best two or three hours to dry. This meant that ordinarily the printed impression did not become hard and dry until two or three hours after it was made. This caused delay and expense, particularly where it was sought to print on both sides of the paper, because having printed one side it was necessary to wait until that side dried before the other side of the paper could be printed. This because the ink, not being dried, would smudge or offset.

Newspapers are printed very fast, because they use paper resembling blotting paper, which consists of a long web of paper run over a cylinder with type on it, printing one side of the paper, which then goes over another cylinder which prints on the other side. It is then cut up and folded right on the press. This is possible, because the paper being like a blotter, absorbs the ink and enables the other side to be printed at once.

When it comes to finer quality of printing—say on good paper with a smooth finish, which it is necessary to use if printing of pictures and half tones is to be done—a quality of paper very different from that used for newspapers is necessary. Formerly, for instance, when it came to printing magazines with large circulations, such as the Saturday Evening Post, Colliers, etc., it was necessary to use a flat bed press, printing on one side of the sheet, and then pile up between the sheets with something to keep them from sticking, and wait three or four hours before printing the other side.

As the circulation became larger the web press was used. Trouble was encountered with the ordinary standard linseed oil, because ink on the first side of the web would not dry. Many experiments were tried to make it possible

to immediately print the second side. A traveling blotter was used which traveled along behind the paper, and then was rolled up on a different roll. This not only did not prevent smudge entirely, but took a good deal of the wet ink off the paper, so the final copy was light; that is, did not have ink enough on it.

Therefore the art attempted to make the ink dry faster by causing the drying oil to absorb oxygen faster. This by heating and blowing ozone on it. That is, after the sheet came out from the type, and before the second side was printed, it was passed over a steam roller or device which warmed the paper. At the same time ozone was blown on it—ozone being a very active form of oxygen—which was absorbed by the oil faster than it would be if it was just quietly exposed to the air.

This method did not prove commercially successful. Shooting ozone on the paper was a difficult and dangerous thing to do in a printing plant, although it did make the drying oils oxidize more rapidly than they had before. That seems to have been the status of the art when the invention in question appeared

The next step was an attempt to speed up printing by using volatile solvents that would evaporate very quickly. But this presented a new difficulty, in that the ink would dry on the rollers before printing, would not print properly as the ink must be wet when printed. It proved more successful, perhaps, in what is known as rotogravure printing, but did not help in the ordinary printing from raised type, with which the thin, watery ink cannot be used. The patentee, Gessler, a chemist employed by a chemical company making pigments and chemicals, was asked by an ink manufacturer to make an odorless ink, and while engaged in that research he claims to have developed the ink in question, which was not only odorless, but could be dried very rapidly on a press. He states in his patent (p. 1, column 1, line 41), after stating the problem, that

it had been proposed to use various types of lacquers in printing processes, particularly cellulose lacquers, because it was well-known that such lacquers are characterized by a high degree of volatility.

Such rapid drying, however, would render an ink made therewith unsuitable for printing from plates or rollers, because they will quickly dry and harden thereon, and will have only the effect of yielding dry or half dry material to the printing form or type, and no satisfactory impression can be made on the material to be printed.

He states (p. 1, column 2, line 3):

> "I have discovered, however, that if in contrast to the above, cellulose compounds, particularly nitrocellulose, are dissolved in solvents with high boiling points, this difficulty may be avoided".

Further he states that if the solvents used are too slow in evaporating, the same difficulties which occur in the case of ordinary oil varnish inks, are encountered. He then states he has found (p. 1, column 2, line 10):

> "* * * that certain such high boiling solvents, very well adapted to dissolve cellulose compounds, have at room temperature such slow drying properties that, while they may be employed as solvents in this ink, and while an excellent impression may be transferred to the surface to be printed upon, the impression will nevertheless be so moist that it is likely to become blurred or smudged by rubbing after many hours or even days."

Then, line 19:

> "This defect, however, may be remedied by the present invention, which involves a recognition of the principle that some of these high boiling solvents exhibit, at temperatures elevated above room tem-

peratures, such a remarkable and quick increase in their vapor pressure that they volatilize rapidly, while at the same temperatures others show little change in their vapor pressures and therefore are practically non-volatile".

By room temperature is meant 20 to 25 degrees centigrade.

This ink of Gessler's is different from the ordinary linseed oil ink, being made of a thickener dissolved in a solvent. The thickener may be a resin or nitrocellulose, or some material of that sort dissolved in the solvent, making a thick solution like linseed oil. However, it does not dry by oxidation like linseed oil, but does dry because the solvent evaporates leaving the thickener which acts as a binding substance that anchors the pigment to the paper. A successful ink for the purposes of the art in question has to be like linseed oil, capable of being spread out in a think [*sic*] film that can be put on the type without it drying.

He claims to have studied the problem and experimented with a number of different solvents, all of which were rejected by printers because they became hard or gummy on the rollers, and would not print. A few printed all right, but took longer than a linseed oil ink to dry, so were not an improvement.

It finally came to Gessler's attention, he testified, that some printing presses were provided with steam-heated rollers. He claims he solved the problem by producing his ink which dried almost instantly when run on an ordinary press provided with a heating drum, or some means of heating the paper immediately after it had gone through the rollers of the press. That is, he claims to have produced an ink that could be printed from raised type and dried instantly. This, it is claimed, was a great boon to the printing industry, because it meant much more rapid, as well as high-grade printing. His ink differed from linseed oil ink in the use of a solvent that dried rapidly.

Memorandum.

The disclosure of the patent he claims; is the discovery for the first time that this problem could be solved; that a printing ink could be made wet enough to spread on the rollers, and do the printing without drying thereon, and that could be dried immediately thereafter. He then goes on telling the art how to make it, saying:

> "You have got to use a binder dissolved in a solvent, and you have got to use a solvent of particular vapor pressure".

Vapor pressure is the quality of a substance, such as a liquid, which causes it to evaporate. This pressure develops inside a liquid and tries to force the particles out of the liquid. It is common knowledge, of course, that a great many liquids; in fact most liquids if left alone, will eventually evaporate. That's because this so-called vapor pressure developed by the molecules inside the liquid tends to push them through the surface and out. This pressure, according to experts, is a perfectly definite, measurable characteristic; that is, the amount of vapor pressure a liquid has at any given temperature can be measured. Vapor pressure determines the rate of evaporation, is a physical property of the liquid itself, depending upon temperature to a certain extent. For instance, when a liquid is boiling actively, its vapor pressure is equal to the pressure of the atmosphere pushing down on it. The main statement of the claim of the patent is:

> "A printing ink which is substantially non-drying at ordinary temperatures and dries instantly on heating of the printed matter, * * * the liquid component having a vapor pressure at 20° C., as low as that of diethylene glycol monobutyl ether at 20° C., and the major part of the liquid component having a vapor pressure which at 150° C. approximates that of ethyl alcohol at ordinary temperatures and forming a stable solution with a solid component".

Memorandum.

Translating this into language that may be comprehended by the man in the street, it means the printing ink in question is substantially non-drying at ordinary temperatures, and dries instantly on heating of the printed matter. The claim is there had been no such thing as an ink that dried instantly by heating; that Gessler's would dry instantly by heating and was therefore imitated, adopted and used.

By using this ink the printer is enabled to run a web of paper through the press at a high speed. The web is then run through the heating device, which evaporates the solvent, thus drying the ink, and permitting the web to be immediately run through the press again and printed on the back side. Concededly the heating device, old in the art and not patentable, is an important part of the patent, which would not have taught anything if it had simply suggested the putting of butyl carbitol in the ink to see what happened.

The patent states you must have a solvent of certain definite vapor pressure characteristics. It names butyl carbitol as possessing the particular vapor pressure characteristics necessary to make the ink, and brings about the essential disclosure claimed for the patent, which is, in short, a printing ink that will stay soft on the rollers, yet dry instantly on application of heat—something that had never been done before, according to the claim.

The defendant in 1938 began to make one of these so-called heat-set inks, adopting as its solvent a petroleum fraction taken off the top of ordinary kerosene, with a vapor pressure it claimed to be about a third of the vapor pressure of butyl carbitol. The record establishes that Gessler was trying to make an odorless ink, and when he was told by Cray that heating means were used on the presses, he immediately picked out—according to his counsel—one of the inks which he had previously made for an odorless ink and pointed out that that ink would work as a quick-drying ink

on a press with a heater. He had never been in the printing business. He says he studied the question of making the ink out of something other than linseed oil, and also the question of getting a solvent and binder in an ink which would be odorless, and not evaporate, dry or harden on the usual long series of printing rollers.

He claims to have done this in 1930, furnishing the ink to one printing concern, which did not use it because it would not dry fast enough on the paper. According to his counsel Gessler brought out, and disclosed in his patent, two entirely new ideas. First: That to stay soft on the long series of printing rollers, it was necessary to have a solvent with a vapor pressure as low as that of butyl carbitol; that is .02 of a millimeter—an extremely low pressure. That is: It was necessary to have a solvent with a vapor pressure as low as that of butyl-carbitol in order for the ink to remain stable on the rollers. And, secondly, something he claims he did not previously know until told by Cray, that all presses had heaters; that one could get instant drying of a thick film of ink on the paper if one picked a solvent like butyl-carbitol, the vapor pressure of which rises rapidly when you heat it up to between 100° and 150°; the temperature to which the paper can be heated without burning or scorching.

It is claimed the prior art was interested because those who had studied the problem were under the impression the solvent had to be actually boiled off in order to get instant drying. There is testimony that Gessler furnished his butyl carbitol ink to the Cray-Finne Company in 1932. The latter added pigment and it was tested out at the Patterson Parchment Paper Company and demonstrated for the first time as a typographic ink which would set moist on the press and dry instantly by heat.

The Curtis Publishing Company, publishers of the Saturday Evening Post, heard of it, became interested and gave it a trial. The only complaint made by the Curtis

Company was that after a long run the printing rollers would develop very fine cracks. Dr. Gessler then adopted a new solvent, to wit, butyl carbitol acetate, which had a vapor pressure similar to that of butyl carbitol. This had very little effect on the rollers. This new solvent was tried out on the Curtis Company presses, when Gessler saw for the first time an imitation of his ink made by the Levey Company—the regular ink supplier of the Curtis Company—running on the same press. It is therefore charged their ink maker had produced a heat setting ink that acted similar to Gessler's. The Curtis Company thereupon threw out the Gessler ink in favor of a less expensive ink made by Levey.

Thereafter attempts were made to imitate the Gessler ink with a cheaper solvent. Mr. Cray tried various petroleum products that were on the market, such as kerosene and fuel oil solvents. The Continental Oil Company, after experimenting and testing different petroleum cuts, produced a petroleum cut which was a satisfactory substitute for butyl carbitol. It was a simple matter to substitute a petroleum cut with the same vapor pressure as butyl carbitol, the only requirement being it must have a low vapor pressure at room pressure, and the right pressure at high temperatures.

Butyl carbitol was not entirely successful as a solvent. Although it did not dry on the presses and dried out in the heaters, it caused the surfaces of the printing glue rollers to crack after a long-continued run. So Gessler says he looked around for a new solvent that would overcome this, and after research work in the Mellon Institute in Pittsburgh, found a solvent called butyl carbitol acetate, which he adopted as a substitute for butyl carbitol where the ink was used on glue rollers. However, he made no change for the ink used on rubber rollers. The substitution of the acetate for butyl carbitol prevented the glue rollers from absorbing moisture or water.

Memorandum.

To sum up: Gessler claims he invented a printing ink which, distinguishable from the prior art, not only as to oil varnish inks of the linseed type, but (p. 1, column 1, line 41):

> "It has also been proposed to use various types of lacquers in printing processes, particularly cellulose lacquers. As is well known, the cellulose solvents used in these lacquers are characterized by a high degree of volatility. Indeed, this characteristic is considered an advantage in lacquers, for in the ordinary use to which lacquers are put, a rapid drying or hardening is highly desirable".

The patent then continues (line 49):

> "However, it is obvious that such rapid drying renders inks made on this principle unsuitable for printing from plates or rollers; for, while they may be applied to printing plates or rollers, they will quickly dry and harden thereon and they will have only the effect of yielding dry or half dry material to the printing form from which, therefore, no satisfactory impression can be made on the material to be printed".

He then states the principal improvement he has discovered is that:

> "I have discovered, however, that if in contrast to the above, cellulose compounds, particularly nitrocellulose, are dissolved in solvents with high boiling points, this difficulty may be avoided".

What Gessler really did, therefore, was to discard the rapidly volatilizing solvent of the prior art lacquered inks,

and use in its place a solvent which did not evaporate quite so fast. In line 20, column 2, p. 1 he states:

> "This defect", [that is the smudging] "may be remedied by the present invention, which involves a recognition of the principle that some of these high boiling solvents exhibit, at temperatures elevated above room temperatures, such a remarkable and quick increase in their vapor pressure that they volatilize rapidly, while at the same temperatures others show little change in their vapor pressures and therefore are practically non-volatile".

In short, his idea embodies the use of a solvent of a type that will keep the ink soft and liquid while it is being spread on the rollers and making the impression on the paper, but which having a high degree of volatility is easily dried by heat applied to the web immediately upon completion of the printing operation.

He then says he found butyl carbitol to be a solvent meeting these requirements, because it had a quick increase in vapor pressure at temperatures above room temperature, so would volatilize rapidly, and any rapid evaporation at room temperature is prevented by the use of a solvent with a high boiling point.

Turning to the defendant's case we find it pleads, in addition to lack of a patentable invention, that the claims of the plaintiff's invention are anticipated by the prior art, citing a long list of patents, only a few of which it is necessary to notice.

The first patent cited in defense is that of Lefferts and Stevens, No. 380,654, issued April 3, 1888. This invention relates to an improved ink for printing on celluloid and other pyroxyline compounds, the ingredients being first (p. 1, col. 2, line 51), a solvent or mixture which is a solvent of pyroxyline; second, a pigment or coloring material in powdered form; third a gum, or gums, or binding agent for holding the particles of pigment together.

Memorandum.

In describing the function of the solvents, which is to penetrate the material and serve as a vehicle for carrying the color and fastening it onto the surface, the patentee says it is desirable that they be of low volatility. And (p. 2, col. 1, line 63):

> "As above stated, it is desirable that the substances used for this office be of a slow-drying nature by virtue of which property they will keep the ink in a moist condition for a long time, producing an action somewhat similar to that of linseed-oil used in the preparation of common engraving or printing ink".

It is then pointed out that this improved ink, when used in connection with heat and pressure, as above stated, produces a hard impression, and the printed sheets or articles may be piled together after they are taken from the press. The inventors then point out that in compounding the ink for use in type printing, it is important that the mixture be of a slow-drying nature, as the ink is spread over a large surface, which naturally permits of a rapid evaporation of the volatile ingredients. This, of course, is the problem stated by Gessler, which he claims to have solved in the same manner. It would therefore seem that the Lefferts and Stevens patent, while old, teaches what is necessary in order to make a heat-set ink, such as Gessler describes.

Next cited is the Howard Waters Doughty patent, application filed August 14, 1922, and patent issued December 26, 1922, No. 1,439,696. This invention is said to relate to inks and vehicles therefor, and particularly to metallic inks suitable for use in stamping titles and decorative designs on book bindings. This patent, however, is apparently not confined to metallic ink, for the inventor says (line 67, col. 2, p. 2):

> "The color will depend upon the particular pigment employed which may be other than metallic in character".

Memorandum.

He states the difficulty which has prevented the use of metallic inks at the outset to be due to vehicles which dry too rapidly on the inking rolls, covering them with a gummy coating, preventing transfer of the ink to the type or die, and that the object of his invention is to provide an ink having the necessary properties, including comparative slowness in drying, without a tendency to become gummy, and a transference of the ink through inking rolls to the type, or die, rapid drying when applied to the work, etc. (p. 1, col. 2, lines 55-70).

He then says in the second column, first page, that the desirable properties sought, to wit, slowness in drying without the tendency to become gummy, etc., may be obtained by using a suitable medium that will permit rapid drying of the ink by the application of heat to the type, or die, and one that should be volatile; that is capable of being vaporized without carbonization, with a boiling point relatively high to reduce vaporation at atmospheric temperatures, and thus prevent rapid drying on the ink rolls. Furthermore, that the medium must be a solvent for the body of the vehicle, with a boiling point within 200° and 300° C., 250 C. being most desirable. It will be recalled that the boiling point of butyl carbitol is within this range.

It is apparent at once that Doughty is talking about a printing ink with a volatile solvent that will not dry on the rolls, and capable of being dried by heat, the patent saying (p. 1, col. 2, line 62):

> "The medium should be volatile, i. e., capable of being vaporized without carbonization, but its boiling point should be relatively high to reduce vaporization at atmospheric temperatures, and consequently to prevent rapid drying on the inking rolls".

Next, adverting to the McElroy patent, No. 1,450,692, application filed June 16, 1922, patent granted April 3, 1923, the object is stated to be (p. 1, col. 1, line 24):

Memorandum.

> "* * * the production of improved printing inks * * * characterized by" (p. 1, col. 1, line 34), "the qualities of drying immediately under the relatively high temperature preferred in embossing metallic powders; * * * of high boiling point and of low volatility".

And (p. 2, col. 2, line 96), that is why it

> "* * * should be used * * * at a temperature substantially that of the boiling point of the solvent vehicle. As will be obvious, however, the ink set forth may be used at lower temperatures, or cold, and the impression artificially dried thereafter".

Which, as counsel points out, you can print it as it is in the fountain, and then when the paper has the ink applied to it, it can be artificially dried. That the McElroy patent is not confined to metallic inks is indicated by the statement (p. 1, col. 1, line 20):

> "Out invention relates generally to printing inks and particularly to those having metallic powders as their pigments".

Jirousek in his patent, April 10, 1934, No. 1,954,627, application filed April 18, 1932, states the problem as Gessler does, to wit (p. 1, col. 1, line 1); that with the customary inks a great loss of time is incurred in setting or drying, before the further steps of cutting, folding, assembling and binding can be attended to, and that efforts to overcome this handicap have resulted in premature hardening of inks on the surfaces of the ink rolls, etc. That a composition, however, which can set quickly, dry rapidly and also handle and feed properly, and distribute freely, is an important desideratum highly desired in the art. That:

> "To the accomplishment of the foregoing and related ends, the invention, then, comprises the features

hereinafter fully described, and particularly pointed out in the claims" (p. 1, col. 1, line 15).

And describes his formula as follows:

> "In the use of such compositions, immediately after the impression is made, heat should be applied, and most advantageously this may be accomplished by a suitable heater, electric, gas, etc. arranged on or adjacent the press, so that the delivered printed impression is subjected to a substantial degree of heat to complete the setting action" (p. 1, col. 2, line 71).

The exact process stated by Gessler, who says that with his ink the printing operation may be carried on in the ordinary manner and at ordinary temperatures, and—

> "At the conclusion of the printing operation, the printed materials may be subjected, in known manner, to sufficient heat to dry the thin film of the print very rapidly" (p. 2, col. 2, line 17).

He pointed out next that no time, labor or material is wasted in delays incident to prolonged drying of the printed goods under the processes then in use.

Further, Jirousek points out that by his method

> "Jobs can be printed on both sides in one operation with one or more colors on both sides of the sheet without smearing or offset, and trapping or superimposing of colors takes place without requirement of particularity relative to printing tack, and the work may proceed to the next operation, such as cutting, folding, stitching, trimming, and other bindery operations" (p. 1, col. 2, line 109).

The difficulty Gessler claims to have overcome.

Memorandum.

In Claim 3 the Gessler patent states:

> "A printing ink which is substantially non drying at ordinary temperatures and dries instantly on heating of the printed matter * * *" (p. 3, col. 1, line 18).

And further on says:

> "* * * substantially all of the liquid component having a vapor pressure at 20° C. as low as that of diethylene glycol monobutyl ether * * *" (p. 3, col. 1, line 29).

20° C. is the same as 70° F., and is referred to as room temperature.

Next this solvent must have, according to the patent in suit.

> "* * * the major part of the liquid component having a vapor pressure which at 150° C. approximates that of ethyl alcohol at ordinary temperatures * * *" (p. 3, col. 1, line 32).

150° C. is as hot as you can heat a piece of paper without scorching or burning it.

The claim is therefore that the vapor pressure of the liquid you use must, at 150° C. be similar to that of ordinary alcohol at room temperature. In other words you have got to have the vapor pressure as low as that of butyl carbitol at room temperature—which is very low indeed. This is required, because under the Gessler method, when the temperature ~~vapor pressure~~ goes up to 150°, the solvent must possess a high volatility and evaporate as quickly as ethyl alcohol would.

Plaintiff alleges that before the alleged infringement by the defendant its ink was in use commercially, with one change, from that described in the patent, to a cheaper solvent substituted for the solvent mentioned in the patent,

which was mentioned only to indicate the right vapor pressure; but now a cheaper solvent—butyl carbitol acetate—is used, which has the same vapor pressure characteristics. This change was necessitated because, as the record discloses, many printing concerns who tried its discarded butyl carbitol inks, because butyl carbitol adversely affected the glue and glycerine ink rolls in common use.

On the defense of lack of invention, the prior art as disclosed in the patents cited and discussed (*supra*), state the problem to be as Gessler does; that is, by use of a solvent that keeps the ink sufficiently soft, so that it can be properly distributed on the rollers without drying and gumming up the presses, and at the same time the ink must dry out quickly so that the paper web can be printed on both sides without too great a delay in between. This calls for a solvent like that used by both plaintiff and defendant, i. e., possessing characteristics of slow evaporation with quick increase in vapor pressure at high temperatures.

It is hard to believe the selection of a slow-evaporating solvent, as called for by the art, involved the exercise of the inventive genius, especially when there were available to the trade solvents of all kinds of vapor pressure. The manufacturers were ready to develop a solvent to order of the exact type requested for the particular purpose any ink manufacturer might have in mind. For instance, butyl carbitol is manufactured by the Carbide and Carbon Chemicals Corporation, and advertised as having a very low rate of evaporation, and recommended as an excellent solvent for nitrocellulose and resins, and said to be useful where a solvent with an extremely low rate of evaporation is required.

It might well be said that a mechanic skilled in the art, in solving this problem of evaporation, would naturally think of and try the application of heat in some form—the advantages of which are stated in all the prior art patents.

It would seem, therefore, that Gessler found that his highly volatile lacquer ink, when applied to the ink-trans-

ferring rolls of the printing press and exposed to the atmosphere dried too fast, and sought a solvent that did not evaporate so fast. That is exactly what he says he did (p. 1, col. 2, lines 2 and 6, *et seq.*). On cross-examination (R. pp. 1030-34), he said he tried different solvents and selected three from a long list—all of which he tried out—and finally accepted butyl carbitol.

In B. B. Chemical Co. *v.* Cataract Chemical Co., 122 Fed. (2d) 526, the patent in question dealt with improvements in making and using a softener of dried pyroxylin cement, to be used in attaching soles of shoes to the uppers. This cement had to be of a certain viscosity, and as Judge Chase states, the problem (p. 529), was to provide a softener which would cut the dried cement sufficiently without being so volatile that it would dry before the operator could place the parts in position in the press. The court says, p. 528:

> "The softening of pyroxylin, or nitrocellulose, cement could, as was well known, be accomplished 'by activating' or 'cutting' the dried cement with a thinner solution of the nitrocellulose dissolved in one or more of a number of its solvents such as acetone, ether, ethyl acetate, butyl acetate or the like. Some of these solvents were of the low boiling point, and some of the high boiling point variety. The lower the boiling point the higher the volatility and vice versa. This was well known and, presumably, any good chemist would obtain the desired volatility by selecting the needed solvent".

Gessler said (R. p. 1032), butyl carbitol possessed the property of low vapor pressure at room temperature, and rapid evaporation when heated above 100°. This being a property of the chemical itself, it could not be the subject of a patent. So all he did was to recognize the physical property of the only solvent he named in his patent—butyl carbitol—and thus obtaining the desired volatility by pick-

ing the proper solvent. As a matter of fact neither party uses butyl carbitol in their ink.

Doughty specified the boiling range of his solvent as being between 200° and 300° C. (p. 1, col. 2, lines 69 and 72), and named several such solvents, to wit, terpineol, benzyl alcohol, terpinyl acetate, benzyl acetate, ethyl benzoate. He also recommends petroleum solvents (p. 2, col. 1, lines 16 and 20).

Butyl carbitol came on the market about 1929. Gessler testified it was his custom to keep in touch with new solvents. Thus he learned about it. So there is the question, did he by selecting one of these new solvents, exercise the inventive talent or genius? According to Judge Patterson in Kaumagraph *v.* General Trade-Mark Corporation (U. S. Dist. Court S'n. Dist. of New York), not reported, affirmed in 102 Fed. (2d) 992:

> "It was a development plainly indicated by recent prior art, a change that was inevitable sooner or later, calling for nothing beyond the skill of the calling". (Citing cases.)

It would therefore seem, in the language of Judge Hand in Ruben Condenser Co. *v.* Aerovox Corp., 77 Fed. (2d) 266, that the patent in suit does not rest upon a patentable invention, but on one of those steps in an art which demand only patient experiment, the court pointing out that in chemistry it is possible to proceed by a system of trial and error. In that case the court goes on to say that invention demands

> "* * * something more than routine testing of obvious combinations".

Butyl carbitol has the characteristics of low vapor pressure at room temperature, with rapid evaporation when heated. The patentee merely recognized this inherent physical property of a suitable solvent—all as set out in the

catalog of the Carbide and Chemicals Corporation, from which Gessler selected butyl carbitol, and which also gave its temperature range.

Doughty and Gessler both recognized that the then current inks contained solvents that exaporated too quickly and dried on the rolls. Both solved this problem by substituting a solvent that would not evaporate so quickly at ordinary temperature. But such a solvent would not dry on the paper, so a heater was specified to do that. This heater was not, and of course could not be, claimed to be new or patentable. Gessler selected butyl carbitol, while Doughty specified (p. 2, col. 1, line 12), a proper solvent should have a minimum boiling point of substantially 230 C. to avoid too rapid a drying of the ink upon the rolls. Stating further (line 16), that certain higher boiling point liquid saturated paraffin hydrocarbons, e. g., those present in fractions of kerosene boiling above 250 C. at normal pressure may be employed instead of terpineol.

Furthermore, Lefferts and Stevens, No. 280,654 (p. 2, col. 2, line 109), speak of the necessity of drying the surface after the application of color:

> "By means of our improved ink, when used in connection with heat and pressure, as above stated, a hard and permanent impression is produced, and the printed sheets or articles may be piled together immediately after they are taken from the press".

The very improvement claimed by Gessler.

These catalogs from which list of solvents Gessler in 1930 selected butyl carbitol on account of its boiling point, also contained full instructions for making the varnish that Gessler said he invented, p. 13 of the 1929 catalog stating that butyl carbitol

> "* * * is an excellent solvent for nitrocellulose and resins".

Memorandum.

Furthermore Gessler states in his patent (p. 1, col. 2, line 44):

> "The solvents or solvent mixtures utilized in the formation of these solutions may be described as solvents having a high boiling point combined with a low vapor pressure at room temperature, but yet further characterized by a rapid rise in their vapor pressure curves upon elevation of the temperature,—that is, by their property of evaporating quickly from a thin layer, as in a print, when the temperature is sufficiently raised".

Again referring to the catalogs above referred to, we find it stated in reference to butyl carbitol:

> "* * * is especially useful in pyroxylin dopes and other plastics where a solvent with an extremely low rate of evaporation is required".

What is the law of the case?

> "'Anticipation' means the disclosure in the prior art of a thing substantially identical with the art or instrument for which a patent is sought. An invention is anticipated only if the invention already known or used by others in this country, or patented or described in a printed publication in this or any foreign country, is identical in substance with it", 48 C. J. §27 (2), p. 28.

Patents are granted to inventors or discoverers of anything new or useful

> "* * * not known or used by others in this country, before his invention or discovery thereof, and not patented or described in any printed publication in this or any foreign country, before his invention or discovery thereof". 48 C. J. §26, p. 28.

Memorandum.

It is not essential in order to anticipate an invention that there be both prior knowledge and prior use. 48 C. J. §33 (3), p. 35.

> "To give a prior patent effect as an anticipation it is not necessary that the invention patented should be generally known, that its existence should have been known to the latter inventor, or that the art or instrument of the patent should be commercially successful". 48 C. J. §44 (4), p. 41.

In Sirocco Engineering Co. *v.* Sturtevant Co., 220 Fed. 137 (certiorari denied 238 U. S. 636), the court, after stating that the structure there had been patented in France said, p. 143:

> "We do not see how, in view of the statute and decisions, we can ignore these French patents, because they were not generally known and were not commercially successful. The law does not make these features essential in considering the structures of the prior art".

With respect to anticipatory effect, prior patents and prior publications rest upon the same ground. No valid patent could be obtained by the inventor for his invention if it was described in a printed publication in this or any foreign country before his invention or discovery thereof.

A printed publication, in the view of the patent law, is anything that is printed and made accessible to any part of the public.

A trade periodical entitled "Printing Equipment Engineer", December, 1931, contains the second half of an article by one M. E. Hanson entitled "Plastic Printing Inks for Rapid Drying". This article describes the same problem that Gessler worked on, referring to such inks as "heat and ozone reactive inks", the heat to be applied to the surface of the running sheet, drying sufficiently to set the ink

enough to run the other side. This article, taken as a whole, would seem to be a complete disclosure on most everything that Gessler claims in his patent, and whether he saw it or not, it is a good statement of the problem the art was wrestling with and the proper approach to the solution.

In a case such as this it has been held:

> "The defending party to prove his defense may do so by showing that the thing patented has been certified or discovered by some other person in this country prior to the alleged invention in the pending suit, or that it has been patented or described in some printed publication in this or any foreign country". Imhaeuser *v.* Buerk, 101 U. S. 647, at p. 660. See also Parks *v.* Booth, 102 U. S. 96.

According to Robinson on Patents, Vol. 1, pp. 446-456, a prior patent becomes a public document when duly granted by the state and issued to the patentee, and a prior publication must be a work of public character intended for general publication, within reach of the public, published before the date of the latter invention.

The Hanson article states that if heat and ozone are used the drying is sufficient to set the ink so that no slip sheets are required, and the whole stack being dry in a few minutes, while in the case of the ordinary inks employing no heat or ozone, the drying time, according to the author, was eight to ten hours, and slip sheets were required. The author states the general characteristics for a plastic ink to be one that will not dry in a thin film exposed to room air at 80° F. for several hours, as it might be spread upon rolls or plates, but merely at a touch of heat after being printed upon the paper dries almost instantly.

The general characteristics for a plastic ink are stated to be one not hardening on the rolls at room temperature; one that when heated on the printed sheet to not over 250°

F., will harden or dry in a small fraction of a second; one that will not deteriorate glue or other soft inking rolls. And:

> "One manufacturer has presented an ink capable of drying with a very brief exposure to heat which will remain moist on inking rolls and plates for a long time. There are many points to be worked out concerning its use as a commercial ink for magazines or newspapers. It gives great promise, however, there being little doubt as to its ultimate success if the necessary work upon it is persistently carried on to a finish".

It then points out the advantages of such an ink to be the elimination of wax sprays, slip sheets or offset paper rolls, and the ink would be less expensive. That such an ink can be dried in a foot or two of web length, and colors applied immediately upon the reverse side, and go to the folding devices at present speeds.

The author, it would seem, had correctly diagnosed the objections to the then used inks, and states the problem and the advantages of a heat-set ink, such as described, not only in the patent in suit, but in the prior art patents referred to (*supra*).

This discussion has been unduly prolonged. It leads us to the conclusion that the patent in suit was anticipated by the prior art patents and the publications referred to. The court is filing herewith findings of fact and conclusions of law to that effect. It is therefore unnecessary to unduly extend this opinion with a discussion of other points raised.

J. Foster Symes,
District Judge Sitting Within And For
The Southern District of New York.

May 22, 1943.

Findings of Fact and Conclusions of Law.

This cause coming on to be heard on this eighteenth day of January, A. D. 1943, and continuing through January 27, 1943. The plaintiff appearing by Robert W. Byerly, Esq. and Ralph M. Watson, Esq., and the defendant by Hoguet, Neary & Campbell (Walter H. Free, Esq. and John F. Neary, Jr., Esq.), and the court having heard the testimony and the argument of counsel and read the briefs filed, and now being fully advised in the premises, doth make its findings of fact and conclusions of law:

Findings of Fact:

1. This suit is for infringement of Claims 3, 10, 11, 12 and 13 of U. S. Patent No. 2,087,190 for a printing ink, issued to the plaintiff for an invention of Albert E. Gessler, plaintiff's title to which is admitted.

2. The patent in suit describes and claims a printing ink, which is non-drying at ordinary temperatures and dries rapidly on heating of the printed matter, and which comprises a pigment dispersed in a vehicle. The vehicle consists of a resin or cellulose compound, and a liquid having a vapor pressure at 20° C. as low as that of butyl carbitol at 20° C., and at 150° C., approximately that of ethyl alcohol at ordinary temperatures.

3. Printing inks which were substantially non-drying at ordinary temperatures and which dried rapidly upon heating of the printed matter were old in the art. Such inks are found and described in the following patents and publications:

Lefferts and Stevens	Patent No.	380,654	Apr. 3, 1888
Doughty	" "	1,439,696	Dec. 26, 1922
McElroy and Clarke	" "	1,450,692	Apr. 3, 1923
Jirousek	" "	1,954,627	Apr. 10, 1934

Hanson Article, December, 1931.

4. It is a common feature of all of these prior art inks that they remain moist on the printing press at ordinary temperatures and dry rapidly upon the application of heat.

5. Said prior art inks consisted of a pigment dispersed in a vehicle consisting of a liquid component and a solid component. In each case a solid component was a resin or cellulose compound. In each case also the solvents used had among them solvents with a vapor pressure which at 20° C. were as low as that of butyl carbitol and which at 150° C. approximated that of ethyl alcohol at ordinary temperatures.

6. The ink of the patent in suit involves no new principle but, on the contrary, utilizes the same principle as the inks disclosed in the aforesaid prior art patents and publications.

7. The patent in suit is anticipated by the patent of Lefferts and Stevens No. 380,654, the patent to Doughty No. 1,439,696, and the patent to Jirousek No. 1,954,627.

8. The patent in suit fails to display invention in view of the state of the prior art.

9. The patent in suit contains claims and disclosures which were made more than two years after public use of the ink, and hence were made too late to be valid.

10. The solvent of defendant's ink contains a solvent which has a vapor pressure at 150° C. of less than one-half of that of ethyl alcohol at ordinary temperatures.

11. The petroleum solvent ink of the plaintiff, which has enjoyed a commercial success, is not the ink described and claimed in the patent in suit.

CONCLUSIONS OF LAW.

1. The court has jurisdiction of the parties and the cause of action.

2. The Gessler patent in suit is anticipated and does not involve an invention, and is invalid.

3. The defendant's ink does not infringe the claims of the patent in suit.

4. The complaint herein should be dismissed and defendant recover its costs—to be taxed by the Clerk—and have execution therefor.

5. Defendant is entitled to judgment dismissing the complaint.

J. FOSTER SYMES,
District Judge, sitting within and for the
Southern District of New York.

Judgment.

This cause came on to be heard on the pleadings and proofs of the parties, and, upon the reading of the briefs filed on behalf thereof and upon the arguments of counsel, now thereupon, upon consideration thereof, it is hereby

ORDERED, ADJUDGED AND DECREED:

1. That the patent in suit No. 2,087,190 is invalid as to claims 3, 10, 11, 12 and 13 in suit;
2. That the defendant has not infringed said claims of the patent in suit;
3. That the Complaint be, and the same is, hereby dismissed;
4. That the defendant recover its costs herein in the sum of $657.57 as taxed by the Clerk, and have execution therefor.

Approved:

J. FOSTER SYMES,
U. S. D. J.

Dated: New York, N. Y.
June 29, 1943.

Approved as to form

ROBERT W. BYERLY,
Attorney for the Plaintiff.

June 28, 1943.

Judgment rendered.

GEORGE J. H. FOLLMER,
Clerk.

July 7, 1943.

Motion for a New Trial.

Plaintiff, Interchemical Corporation, moves for a new trial under the provisions of Rule 59 of the Federal Rules of Civil Procedure and prays:

1. That the Court open the judgment of dismissal which has been entered.

2. That the Court take additional testimony, viz.: the testimony of Milton E. Hanson as to the facts stated in his affidavit which is annexed hereto.

3. That the Court make new findings of fact and conclusions of law, and direct the entry of a new judgment in favor of the plaintiff.

The grounds of this motion are that the Court, in excluding the testimony of Milton E. Hanson at the trial, and thereafter relying on an article written by said Milton E. Hanson, made an error highly prejudicial to the plaintiff; that the Court has not been fully informed with respect to the state of the art because of the error in excluding the testimony of Milton E. Hanson, and has failed to evaluate the history of the art to which the patent in suit relates, and in consequence has erroneously held the patent in suit anticipated by prior patents and publications which failed to solve the problem which was successfully solved by the patent in suit; that the findings are incomplete and in part contrary to the evidence; that the conclusions that the patent in suit is invalid and not infringed are contrary to the law, all as set forth in detail in a memorandum submitted herewith.

The annexed affidavit of the aforesaid Milton E. Hanson will be relied upon in support of this motion.

Robert W. Byerly,
Attorney for Plaintiff,
225 Broadway,
New York City.

Affidavit of Milton E. Hanson.

STATE OF NEW YORK, }
COUNTY OF NEW YORK, } ss.:

MILTON E. HANSON, being duly sworn, deposes and says:

I am a mechanical and chemical engineer employed by B. F. Sturtevant Company of Boston, Massachusetts, in their office at Crestmont & Haddon Avenues, Camden, New Jersey. Neither I nor my employer has any connection with either party to the above-entitled litigation.

I reside at Haddonfield, New Jersey, which is less than one hundred miles from New York City.

Early in the Fall of 1931, I wrote an article entitled "Plastic Printing Inks for Rapid Drying", the second part of which was published in the December number of the publication "Printing Equipment Engineer", which I am informed constitutes a part of Defendant's Exhibit G in the above-entitled suit.

My article contained the following statement, which I am informed is quoted on page 19 of the opinion of the District Court in the above-entitled case:

> "One manufacturer has presented an ink capable of drying with a very brief exposure to heat which will remain moist on inking rolls and plates for a long time. There are many points to be worked out concerning its use as a commercial ink for magazines or newspapers. It gives great promise, however, there being little doubt as to its ultimate success if the necessary work upon it is persistently carried on to a finish."

The manufacturer to which I referred in this statement was Standard Textile Products Co. of Buchanan, New York. At the time I wrote the statement in the early Fall of 1931, I had received some sample inks from this company and had made some laboratory tests of them. After I had

written the above statement, I arranged to have these inks tested on a standard printing press and found that they dried and thickened so badly on the ink rollers of the press that they could not be used. I called this fact to the attention of Standard Textile Products Co. in a letter which I addressed to them on November 15, 1931. A photostatic copy of this letter is attached to this affidavit and marked "Exhibit A". I never succeeded in obtaining an operative quick-drying ink from this manufacturer.

In my said article I stated the characteristics which I believed that a quick-drying ink should have. These, as stated in the article, included:

> "1. One not hardening on rolls, plates or in fountain at room temperature even if press is stopped for several hours.
>
> "2. One when heated on the printed sheet to not over 250°F. [121°C.] will harden or dry in a small fraction of a second."

I worked for over a year with several different ink companies in an endeavor to produce an ink having these characteristics, but I never succeeded in getting or producing such an ink.

My work in endeavoring to develop a quick-drying ink started in August 1931. In it I was associated with Mr. Alfred MacKay, an engineer with the American Salpa Corporation of New York who put me in touch with the Standard Textile Products Co. of Buchanan, New York. At that time, I was in touch with the Curtis Publishing Company of Philadelphia and hoped to develop a quick-drying ink for magazine printing. In two letters which I addressed to the Standard Textile Products Co. on October 20, 1931, I told them that the Curtis Publishing Company had agreed to test the inks which I might develop and also pointed out the very large demand for such an ink. Photostatic copies of my two letters of October 20, 1931 to the Standard Textile

Products Co. are annexed to this affidavit and marked "Exhibit B" and "Exhibit C".

I worked with the Standard Textile Products Co. on the problem from August 1931 until December 1931. I tested the inks which I obtained from them on a printing press of the Curtis Publishing Company in November 1931 and found that they dried and thickened on the rollers, as pointed out in my letter of November 15, 1931, previously referred to and attached to this affidavit as "Exhibit A". Experiments and tests were continued until December 1931, but no usable quick-drying ink was developed. I terminated my work with the Standard Textile Products Co. on December 18, 1931.

After discontinuing work with the Standard Textile Products Co. in December 1931, I endeavored to obtain an ink having the characteristics specified in my article from other ink manufacturers. I first applied to the International Printing Ink Corporation and they advised me that they could not furnish such an ink. I then applied to Sinclair & Valentine, ink manufacturers in New York City. Over a period of about six months, Sinclair & Valentine furnished me with samples of a number of different inks which I tested to ascertain whether or not they had the desired characteristics. I found that all of them would dry on the rollers of a press and were unusable. After about six months, Sinclair & Valentine notified me that they could do nothing further on the problem, and I dropped the matter.

I have obtained a considerable number of United States patents on various inventions I have made. I never applied for a patent on a printing ink having the characteristics specified in my said article because I never succeeded in producing such an ink.

I called the facts which I have stated above to the attention of Mr. Robert W. Byerly, counsel for Interchemical Corporation, on January 7, 1943, and he requested me to appear as a witness for his client at the trial of the case

and said that he would notify me by telephone when my presence was required. He pointed out that, as I lived within one hundred miles from the place of trial, I could be subpoenaed to testify.

On January 25, 1943, Mr. Byerly telephoned me requesting me to appear in Court at the trial of this case on January 26, 1943. I told him that I was confined to my home by an attack of grippe and could not come to New York. A subpoena was then served on me requiring me to testify in New York, but, as I had considerable fever, my physician refused to let me come to New York on January 26. On January 27, 1943, I felt a little better and spent the morning journeying to New York (a trip of about three hours). I arrived in Court at 2:00 in the afternoon of January 27, 1943 and was informed that the trial had been concluded and that my testimony could not be taken. I remained in Court for an hour to listen to the oral arguments which counsel for the parties were presenting. Had it not been for my attack of grippe and the fever which I had on January 26, 1943, I should have been in Court on that day in obedience to the subpoena which was served on me.

MILTON E. HANSON

Subscribed and sworn to before me
this 8th day of June, 1943.

ALMA I. LUNDGREN
(Notary's Stamp)

[NOTARIAL SEAL]

Affidavit of Milton E. Hanson.

Exhibit A.

MILTON E. HANSON
MECHANICAL AND CHEMICAL ENGINEER
Member A.S.M.E.

204 Morgan Ave.,
Collingswood, N. J.
Nov. 15, 1931.

Mr. E. H. Frohner,
c/o Standard Textile Products Co.,
Buchanan, N. Y.

Mr. Frohner:

I received your last samples including the quart can of Black. You did not state whether this black was to match the thick magazine ink or the thinner newspaper ink.

I tried it on a magazine press in Philadelphia of the design as shown on the attached sketch. The ink was placed in the fountain and immediately spread over the inking rolls shown very nicely up to the last two. There it started getting thick and piling up and did not transfer to the plate at all as an ink, only as flakes and blotches. We got no printing at all. Within a minute or so we had to stop the press for fear of wedging the inking rolls.

What can you do about this? I would say we must have a much slower drying ink. Please make another quart can of black, thick like the magazine sample I brought to you at the time of my last visit, but to dry very much more slowly. Do not fear getting it too slow, we always can make them faster. These rolls revolve very rapidly and I suppose it is the air streams set up conduct the solvent away rapidly. The ink rubbed out thin on a piece of glass lasts much longer than on the rolls. Lets make this next one real slow and try that.

Affidavit of Milton E. Hanson.

Is there anything you can send me to make Batch No. 4 slower or should I return it to you. I am afraid now that Batch No. 1 you sent for the newspaper test scheduled for this week is going to be too fast for their rolls revolve even faster than on the press shown on the sketch attached.

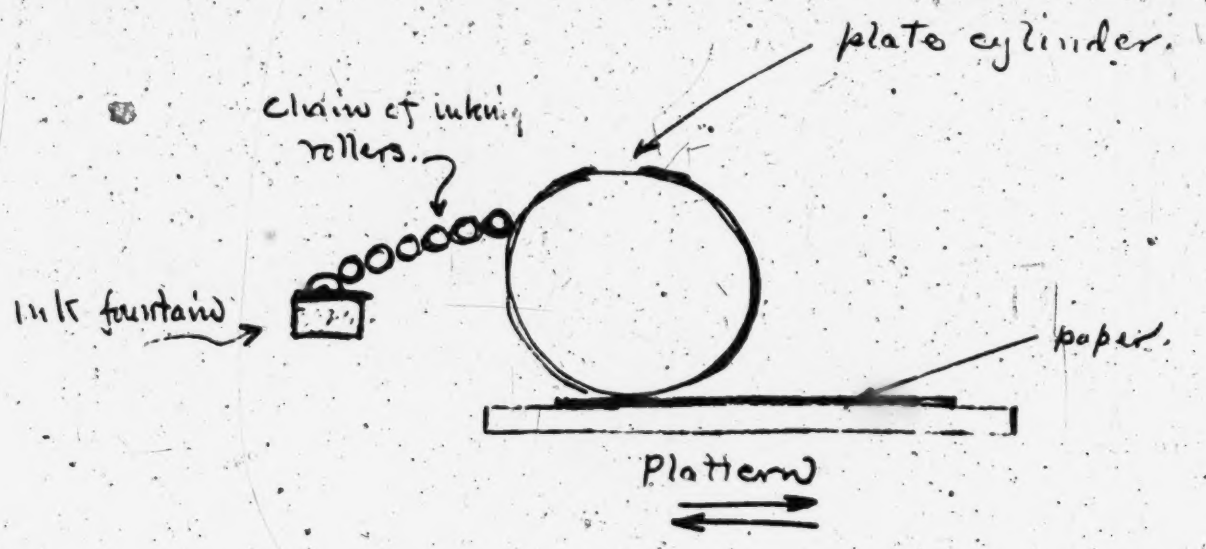
What do you think?

Very truly yours,

M. E. HANSON

Exhibit A.

(*Opposite* ☞)



1059

Sketch of ink transfer part of Flat Bed Press.

M E Hansen
Nov. 15 1931.

Exhibit B.

MILTON E. HANSON
MECHANICAL AND CHEMICAL ENGINEER
Member A.S.M.E.

204 Morgan Ave.,
Collingswood, N. J.
October 20, 1931.

The Standard Textile Products Co.,
Laboratory and Experimental Dept.,
Buchanan, N. Y.

Att: Mr. Frohner

Gentlemen:

Supplementing my letter of this same date please refer to the third paragraph concerning the Curtis Publishing Co. in which I asked for one gallon each of blue and red slow drying like that first one quart of blue you sent me. I did not state, though, that the consistency must be very thick. Magazine ink is so thick that it will not pour out of a can, just about the consistency of vasaline, possibly just a trifle thinner. If you get it a bit too thick I still have some of the thinner your gave Mr. Mackay to give me last September.

Do you think you can make such an ink? They use a chain of six rolls, 2" in dia. between the fountain and the type face to work the ink into a very closely controlled thin viscous film of thick pigment density. These rolls hunt longitudinally against each other causing each ink particle to take a zigzag course from the fountain onto the face of the type. Thus the reason for the thick paste like ink.

Also they say the pigment particles used must be 300 to 325 mesh, very fine as their screens on the type are very fine, twice as fine as the pictures you gave me when I was up to see you. Pick up any Saturday Evening Post and look at

the color printing under a good magnifying glass. They want good sharp edges on each individual little piece of the type screen.

This Curtis crowd are very exacting. I know them, I have worked with them many years. They incidentally are the best in the business. Their ink bill last year was very nearly two million dollars. Even a part of their business is worth going after.

Don't give up until I do.

Cincerely

M. E. HANSON

Exhibit C.

MILTON E. HANSON
MECHANICAL AND CHEMICAL ENGINEER
Member A.S.M.E.

204 Morgan Ave.,
Collingswood, N. J.
October 20, 1931.

The Standard Textile Products Co.,
Laboratory and Experimental Dept.,
Buchanan, N. Y.

Att: Mr. Frohner.

Gentlemen:

I had a very interesting meeting with the parties who are going to run some real tests on your ink for newspaper printing. It is going to take longer that I thought to get their press ready, about two weeks from now they say.

They ask for three gallon samples as the fountains available require that much to properly fill them. You will have

to send me two more gallons each of the red and blue, your Batch #1.

Curtis Publishing Co. have agreed to run a test on magazine printing. They like the very slow blue like the first Quart you sent me. It must not dry on plates as their presses run slowly, stopped often and shut down for three hours sometimes. Send me a gallon each of this slow in red and blue. They will use heat to dry with, a heat light stretched over the paper just as it leaves the printing cylinders.

I was talking with Mr. Mackay, yesterday. I believe he intends to see you. I need a cost price on this ink. People are now getting interested and are asking how much we are going to charge them for it.

Very truly yours,

M. E. HANSON.

Affidavit of Walter H. Free.

STATE OF NEW YORK, }
COUNTY OF NEW YORK, } ss.:

WALTER H. FREE, being first duly sworn, deposes and says:

That he is a member of the firm of Hoguet, Neary & Campbell, attorneys for the defendant in the above-entitled cause; that he prepared the case for trial and conducted the trial of the above-entitled cause on behalf of defendant; that in preparing the case for trial, a search among the prior art patents and publications disclosed an article by Milton E. Hanson, in the December 1931 edition of Printing Equipment Engineer, which set forth the complete requirements for a press-stable, heat-drying printing ink, and further indicated that the author had knowledge of inks which conformed to the requirements set forth in the article; that in September, 1942, he requested John M. Prutzman, one of the associates of the above-entitled firm, to arrange to meet Mr. Hanson for the purpose of ascertaining any further information that Mr. Hanson had, particularly with regard to the composition of the commercial heat-set ink mentioned in Hanson's article, and the name of its manufacturer.

On information and belief, deponent avers that on September 25, 1942, said John M. Prutzman interviewed Mr. Hanson in his office at the B. F. Sturtevant Company, Camden, New Jersey, and was informed by Mr. Hanson that he had done considerable experimenting with the inks described in his article and had made successful laboratory tests thereof and had witnessed tests of such ink on full-sized typographic presses; that said tests were successful, subject to slight refinements in the ink, principally to make it softer and more "buttery", so that the ink could be transferred more readily from the type to the paper; that on the basis of such substantially successful tests, Mr. Hanson wrote the said article in the Printing Equipment

Engineer; that Mr. Hanson averred that he had obtained the ink, so successfully tested on a full-sized press, from Standard Textile Products Company, of Buchanan, New York; that a Mr. Frohner of that company had compounded that ink, but Mr. Hanson did not know the composition of that ink.

That deponent, after receiving from Mr. Prutzman the report of his interview with Mr. Hanson, believed that further investigation of the commercial ink produced by Standard Textile Products Company and used successfully by Mr. Hanson, was justified, as a possible prior public use defense, and he thereupon requested Mr. Prutzman to get in touch with Standard Textile Products Company in order to ascertain the composition of the ink furnished Mr. Hanson.

On information and belief, Mr. Prutzman called at the office of Standard Coated Products Corporation, 40 Worth Street, New York City, formerly Standard Textile Products Company, and was informed that Standard Coated Products Corporation is a subsidiary or affiliate of plaintiff herein, and that no one connected with Standard Coated Products Corporation would be inclined to divulge any information or assistance which might be to the detriment of plaintiff in this action.

That inasmuch as complete information about the ink, as obtained by Mr. Hanson from Standard Textile Products Company, was peculiarly within the knowledge and under the control of plaintiff herein, deponent gave consideration to obtaining the deposition and records of said Mr. Frohner by subpoena and subpoena *duces tecum*, but before doing so deponent sought to locate Mr. Frohner, and ascertained that Mr. Frohner had died several years previously.

That in view of Mr. Frohner's death and the practical impossibility of obtaining information from Standard Coated Products Corporation, in view of its connection with plaintiff, deponent could not locate any one else who had knowledge of the facts regarding the composition of

these commercial inks referred to in the Hanson article of December, 1931; that shortly thereafter, deponent satisfied himself that the other defenses available to defendant were adequate to present the case to the Court for adjudication, and accordingly did not continue the investigation of the early ink of the predecessor of Standard Coated Products Corporation under the formal modes of discovery provided by the equity rules; and,

That the reason that the facts of Mr. Prutzman's interviews with Mr. Hanson, and with the officials of Standard Coated Products Corporation are not set forth in an affidavit by him is that Mr. Prutzman is now and has been since about March 10, 1943, with the armed forces.

WALTER H. FREE.

Subscribed and sworn to before me this 19th day of July, 1943.

LEE MANSELL,
Notary Public.

(Notary's Stamp.)

Opinion on Plaintiff's Motion for New Trial.

The plaintiff has filed a motion for a new trial, asking that the court take additional testimony and make new findings of fact and conclusions of law. The main ground urged is that the court excluded the testimony of one Milton E. Hanson. According to the record (pp. 1041-42), the defendant had introduced an article written by the said Hanson and published in a trade journal entitled "Printing Equipment Engineer" in 1931.

The court was willing to hear the testimony of Mr. Hanson, but he was not produced, and the court having waited

rected by
ge Symes
is letter
d in Clerk's
ice on
r. 30, 1943.

~~several hours~~ to permit him to appear, closed the case. Counsel for the plaintiff in a colloquy with the court stated:

> "This witness will testify as to the state of the art * * *. I propose to call Mr. Hanson to show much more fully than this article does the state of the art."

Furthermore, counsel for plaintiff said, in response to a question by the court, that Mr. Hanson would

> "explain it and give a much clearer view of the art. No, he won't repudiate the fact that he wrote it, certainly."

The court further reminded counsel that it had given notice two or three times the case could no longer be delayed, and thereupon closed the testimony. Thus the court is asked to set aside its judgment and decision in a case that took at least eight days to try, in order to hear the testimony of Mr. Hanson, whose testimony, according to counsel, would not have taken more than half an hour.

A reading of the opinion indicates the court did not rely much upon the article of Hanson. The court made several findings of fact, only one of which would be affected by any testimony Mr. Hanson might have given on the state of the prior art. On this question—to which the court cited four patents as showing anticipation—a change in its decision, as requested, would require the court to rely upon testimony Hanson might give, and disregard the four patents cited by the court. The Hanson article in question gave complete specifications for the ink of Gessler—the patentee in question. All the latter had to do thereafter was to make a series of trial and error experiments to arrive at the particular solvent necessary for the manufacture of the ink in question. The solvent chosen by Gessler was disclosed to the art by the catalogue of Carbide and Chem-

icals Corporation (Plaintiff's Ex. G), from which the patentee admitted he selected the solvent he used.

The motion for a new trial is denied.

J. Foster Symes,
District Judge, sitting within and for the Southern Distfict of New York.

August 2, 1943.

Order.

This case coming on by motion of the plaintiff for a new trial, and upon consideration of the briefs and affidavits submitted in support thereof and in opposition thereto, it is hereby

Ordered that the said motion is denied.

Dated, New York, N. Y., August 27th, 1943.

J. Foster Symes,
District Judge sitting within and for the Southern District of New York.

Approved as to form:

Robert W. Byerly

Robert W. Byerly,
225 Broadway,
New York, N. Y.
Attorney for Plaintiff.

Notice of Appeal.

Notice is hereby given that Interchemical Corporation, the plaintiff above-named, hereby appeals to the Circuit Court of Appeals for the Second Circuit from the final judgment entered in this action on July 7, 1943, and from the order denying plaintiff's motion for a new trial entered in this action on August 30, 1943.

(Sgd.) Robert W. Byerly

ROBERT W. BYERLY,
Attorney for Appellant,
Interchemical Corporation,
225 Broadway,
New York City.

To:

HOGUET, NEARY & CAMPBELL,
90 Broad Street,
New York City.

Order, Dated October 8th, 1943.

On the annexed consent of the attorneys for the respective parties hereto, it is hereby

ORDERED that the time within which the plaintiff-appellant may serve the proposed record on appeal pursuant to Rule 31 of the Civil Rules of this Court be and it is hereby extended for a period of fifty-nine (59) days to December 11, 1943, and that the time within which the record on appeal may be filed and the action docketed pursuant to Rule 73(g) of the Federal Rules of Civil Procedure be similarly extended to the 11th day of December, 1943.

(Sgd.) GEORGE J. H. FOLLMER,
Clerk, United States District Court.

New York, New York,
October 8th, 1943.

The entry of the foregoing order is hereby consented to and notice of entry thereof is waived.

(Sgd.) ROBERT W. BYERLY,
Attorney for Plaintiff-Appellant.

(Sgd.) HOGUET, NEARY & CAMPBELL,
Attorneys for Defendant-Appellee.
By W. H. FREE.

Order and Consent, Dated November 29, 1943.

On the annexed consent of the attorneys for the respective parties hereto, it is

ORDERED that the time within which the plaintiff-appellant may serve the proposed record on appeal be and it is hereby extended for a period of thirty-one (31) days to January 11, 1944, and that the time within which the record on appeal may be filed and the action docketed pursuant to Rule 73(g) of the Federal Rules of Civil Procedure be similarly extended to the 11th day of January, 1944.

(Sgd.) ALEXANDER M. BELL,
Clerk of the United States
Circuit Court of Appeals.

Dated, November 29, 1943.

The entry of the foregoing order is hereby consented to and notice thereof is waived.

(Sgd.) ROBERT W. BYERLY,
Attorney for Plaintiff-Appellant.

(Sgd.) HOGUET, NEARY & CAMPBELL,
Attorneys for Defendant-Appellee.

By W. H. FREE.

Order, Dated January 6, 1944.

On the annexed consent of the attorneys for the respective parties hereto, it is

ORDERED that the time within which the plaintiff-appellant may serve the proposed record on appeal be and it is hereby extended for a period of thirty (30) days to February 10, 1944, and that the time within which the record on appeal may be filed and the action docketed pursuant to Rule 73(g) of the Federal Rules of Civil Procedure be similarly extended to the 10th day of February, 1944.

(Sgd) ALEXANDER M. BELL,
Clerk of the United States Circuit Court of Appeals for the Second Circuit.

Dated, January 6, 1944.

The entry of the foregoing order is hereby consented to and notice thereof is waived.

(Sgd) ROBERT W. BYERLY,
Attorney for Plaintiff-Appellant.

(Sgd) HOGUET, NEARY & CAMPBELL,
by W. H. FREE,
Attorneys for Defendant-Appellee.

Order and Consent, Dated November 29, 1943.

On the annexed consent of the attorneys for the respective parties, it is hereby

ORDERED that the following original exhibits withdrawn from the District Court by, and remaining in the hands of, counsel for the respective parties hereto shall be filed by them in the Circuit Court of Appeals before the hearing of the appeal herein:

Plaintiff's Exhibits Nos. 6, 7, 8, 9, 10, 11, 12, 13, 15, 16 id., 17, 18, 19, 20, 29, 30, 31, 32, 34, 35, 36, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 50 id., 51 id., 54, 55, 56, 58, 60, 61, 62, 66 id. and 67.

Defendant's Exhibits Nos. A, D, H, I, J, K, L-1, L-2, L-3, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, A-1, B-1, C-1, D-1, E-1, F-1, G-1, I-1, J-1, K-1, K-2, K-3, K-4, LL, M-1, N-1, O-1, P-1, Q-1, id., R-1 id., S-1, T-1, U-1, V-1, W-1, X-1, Y-1, Z-1, A-2, B-2, C-2, D-2, E-2, F-2, G-2, H-2, I-2, J-2, KK, LLL, M-2, O-2, R-2, S-2 and U-2.

(Sgd.) WM. BONDY,
United States District Judge.

New York, New York,
November 29, 1943.

The entry of the foregoing order is hereby consented to and notice of entry thereof is hereby waived.

(Sgd.) ROBERT W. BYERLY,
Attorney for Plaintiff-Appellant.

(Sgd.) HOGUET, NEARY & CAMPBELL,
Attorneys for Defendant-Appellee.

By W. H. FREE.

Stipulation Regarding Record On Appeal.

IT IS HEREBY STIPULATED AND AGREED by and between counsel for the respective parties hereto as follows:

1. That the following exhibits need not be reproduced and included in the printed record on appeal but that appellant shall bind up and furnish three copies of such omitted paper exhibits to the Circuit Court of Appeals at the argument of the appeal herein and will bind up and furnish an additional copy to counsel for the appellee:

Plaintiff's Ex. 13—Graph testified to by the witness Bragdon.

Plaintiff's Ex. 18—Diagram testified to by the witness Hurley.

Plaintiff's Ex. 20—Formulae cards for the nitrocellulose lacquer having laboratory code number 895-1, and the manufacturing code number W4608.

Plaintiff's Ex. 34—Copy of pamphlet entitled "Report of Committee on Standardization of Petroleum Specifications 'Bulletin No. 5'."

Plaintiff's Ex. 35—United States Government specifications testified to by the witness Taylor.

Plaintiff's Ex. 36—Catalogue of the Hilton Davis Company (cover and pp. 53, 54).

Plaintiff's Ex. 45—Chart testified to by witness Bragdon as showing the same curve as shown in Taylor's Exhibit B-1 in the upper line drawn in red.

Plaintiff's Ex. 46—Graph indicating the witness Bragdon's determination of the boiling point of the I. P. I. solvent.

Plaintiff's Ex. 47—Graph drawn by the witness Bragdon to show the comparison between the curves.

Plaintiff's Ex. 48—Photostat of pages from the book entitled "Petroleum."

Plaintiff's Ex. 50 id.—Proof of the vapor pressure of the kerosene about which the witness Bragdon testified.

Plaintiff's Ex. 51 id.—Chart showing the boiling range of the kerosene at about 250 made and testified to by the witness Bragdon and the kerosene above 250 given by Mr. Taylor on Exhibit B-1.

Plaintiff's Exhibit 54—Barrett Company's catalog (index, title page and page 12).

Plaintiff's Ex. 55—Chart showing the witness Bragdon's determination of defendant's 502-C ink oil, the I. P. I. petroleum solvent mentioned in Defendant's Exhibit B-1.

Plaintiff's Ex. 56—Chart showing that the vapor pressure of oil of cassia at 20 degrees is about .2 of a millimeter.

Plaintiff's Ex. 61—Schematic drawing showing the vapor pressure measuring apparatus in the plaintiff's laboratories.

Plaintiff's Ex. 62—Notebook which the witness Gessler kept of his work when he was the chief chemist of the Zinsser Company (3 pages relating to Experiment 842B; 4 pages relating to Experiment 842C; and 2 pages relating to Experiment 842E).

Plaintiff's Ex. 67—Smudged Montgomery Ward sheet.

Defendant's Ex. A—Set of curves referred to by the witness Bragdon.

Defendant's Ex. D—Memorandum testified to by the witness Hayward.

Defendant's Ex. J—Photostatic copy of the Brewer and Gardner article.

Defendant's Ex. K—Photostatic copy of the original of Chemical Society for 1888, pages 42-45 inc., which is referred to in the footnote 6 of the Brewer and Gardner Article.

Defendant's Exs. L-1, L-2, L-3—Photographs of the apparatus used by the witness Taylor to determine the vapor pressure characteristics of certain solvents.

Defendant's Ex. M—Report of Mr. Taylor on the vapor pressure of oil of cloves.

Defendant's Ex. N—Data sheet made by the witness Taylor in determining the vapor pressure for butyl carbitol.

Defendant's Ex. O—Chart referred to by the witness Taylor.

Defendant's Ex. P—Set of curves identified by the witness Taylor.

Defendant's Ex. Q—Set of curves showing solvents obtained from Lefferts and Stevens patent, including butyl carbitol and defendant's 502-C oil.

Defendant's Ex. W—Photograph illustrating the still used by the witness Taylor to obtain the petroleum fraction mentioned in the Doughty patent.

Defendant's Ex. X—Report of Mr. Taylor on the vapor pressure of kerosene fraction.

Defendant's Ex. A-1—Invoice and order identifying the kerosene used by the witness Taylor in making the solvent according to the Doughty patent.

Defendant's Ex. B-1—Distillation range chart testified to by the witness Taylor.

Defendant's Ex. C-1—Photograph of the standard equipment used for an A. S. T. M. distillation range test.

Stipulation Regarding Record on Appeal.

Defendant's Ex. D-1—Chart indicating the vapor pressures at various temperatures.

Defendant's Ex. E-1—Chart which is an enlargement of the vapor pressure chart given in "Industrial and Engineering Chemistry."

Defendant's Ex. F-1—Print from a Montgomery-Ward catalog bearing the signature of the witness Taylor.

Defendant's Ex. G-1—Pages 316 and 317 of the 1942 Pharmacopeia of the United States of America and page 235 of the 1882 volume of the United States Pharmacopeia.

Defendant's Ex. I-1—Straight line vapor pressure chart made and testified to by the witness Taylor.

Defendant's Ex. J-1—Photostatic copies of pages 352 and the fly-leaf of the Mellon Institute book published in 1920.

Defendant's Exs. K-1, K-2, K-3, K-4—Four invoices dated January 2, January 29, January 30, and February 15, 1941, from Magie Brothers Petroleum Products to Sinclair & Carroll Company, Inc.

Defendant's Ex. LL—Laboratory report marked "Laboratory No. 144,560 dated July 1, 1941 to Magie Bros. Oil Co., From Phoenix Chemical Laboratory, Inc."

Defendant's Ex. M-1—Fly-leaf and pages 124-128 inc. of Nelson's book entitled "Petroleum Refinery Engineering, First Edition" published in 1936.

Defendant's Ex. N-1—Card produced by the witness Theuer showing the first printing of the September 1930 "Metal Progress."

Defendant's Ex. P-1—Printing record testified to by the witness Theuer.

Defendant's Ex. R-1 id.—Formula for Jirousek ink.

Stipulation Regarding Record on Appeal.

Defendant's Exs. S-1, T-1—Order and reorder of the Commercial Printing & Litho Company.

Defendant's Ex. U-1—Sales slip of the A. L. Garber Company dated March 2, 1932.

Defendant's Ex. A-2—Invoice dated November 18, 1942, from Sinclair & Carroll to W. F. Hall Printing Co.

Defendant's Ex. F-2—Card dated November 3, 1942, entitled "Heat Set Varnish No. 20798."

Defendant's Ex. G-2—Formula card dated November 5, 1942, marked "Rotary Yellow, 1st Down, No. 20805."

Defendant's Ex. H-2—Formula card marked "Rotary Red, 2nd Down, No. 20806", dated November 5, 1942.

Defendant's Ex. I-2—Formula card dated November 5, 1942, marked "Rotary Blue, 4th Down, No. 20808."

Defendant's Ex. J-2—Formula card dated November 5, 1942, marked "Rotary Black, 3rd Down, No. 20807."

Defendant's Ex. KK—Montgomery-Ward Christmas book of 1942, page 59.

Defendant's Ex. O-2—Article in Industrial and Engineering Chemistry for July 1926 which was referred to in the filewrapper of the patent in suit.

Defendant's Ex. R-2—Comparative curves between butyl carbitol, the plaintiff's and defendant's solvent.

Defendant's Ex. U-2—1929-1930 Carbide & Carbon Chemicals Corporation catalog (title page, table facing page 7 and pages 16, 17).

2. IT IS FURTHER STIPULATED that the following exhibits may be regarded as physical exhibits and need not be reproduced by appellant:

Stipulation Regarding Record on Appeal.

Plaintiff's Ex. 6—Sample of ink with an alcohol solvent used by the witness Bragdon.

Plaintiff's Ex. 7—Film of ink on paper, the ink being that of Exhibit 6.

Plaintiff's Ex. 8—Second ink sample used by the witness Bragdon, being ink whose solvent is butyl acetate, having a vapor pressure of 1½ centimeters at room temperature.

Plaintiff's Ex. 9—Film made with ink (Exhibit 8).

Plaintiff's Ex. 10—Butyl carbitol ink.

Plaintiff's Ex. 11—Paper.

Plaintiff's Ex. 12—Sheet which the witness Bragdon placed on top of Exhibits 7 and 9.

Plaintiff's Ex. 15—Print testified to by the witness Cray as being the first heat-drying ink he saw.

Plaintiff's Ex. 16 id.—Memorandum in the handwriting of Dr. Dufford.

Plaintiff's Ex. 17—Sheet of November 12, 1932 belonging to Mr. Finne.

Plaintiff's Ex. 19—Sales invoices testified to by the witness Blackmore.

Plaintiff's Ex. 29—Series of invoices from the International Printing Ink Corporation running from December 19, 1933 to January 29, 1936.

Plaintiff's Ex. 30—Group of invoices running from August 12, 1936, through November 18, 1942, showing purchases made from the International Printing Ink Company.

Plaintiff's Ex. 31—Copies of formulae testified to by the witness Jeuck.

Plaintiff's Ex. 32—Copies of formulae MX-3858 and MX-3859.

Plaintiff's Ex. 39—Sheet from Life Magazine testified to by witness Busby as having been printed on one side.

Plaintiff's Ex. 40—Sheet which was printed with heat-set inks on Press 89.

Plaintiff's Ex. 41—Sheet testified to by witness Busby as having been printed on Press 100.

Plaintiff's Ex. 42—Sheet which was printed on a 2-color Life 64 page press.

Plaintiff's Ex. 43—Single-color heat set signature printed on a 64-page Life Press.

Plaintiff's Ex. 44—Single-color signature for Time Magazine printed on a 64-page Time press.

Plaintiff's Ex. 58—Ink prepared in accordance with the formula of the Doughty patent, containing four parts of terpineol, 1 part of rosin and 10 parts of bronze powder.

Plaintiff's Ex. 60—Ink vehicle of the McElroy patent produced by the witness Bragdon.

Plaintiff's Ex. 66 id.—Catalogs of the Carbide & Carbon Chemicals Corporation from 1930 to 1935.

Defendant's Ex. H—Piece of paper on which the witness Taylor made demonstration.

Defendant's Ex. I—Cardboard having on it four samples of printing, testified to by the witness Taylor.

Defendant's Ex. R—Sample container of defendant's solvent in the ink which is claimed to infringe.

Stipulation Regarding Record on Appeal.

Defendant's Ex. S—Sample of the ink which was made up in accordance with the Doughty patent.

Defendant's Ex. T—Sample of Doughty ink produced by Mr. Taylor.

Defendant's Ex. U—Sample of the Gessler ink.

Defendant's Ex. V—Sheet identified and described by the witness Taylor.

Defendant's Ex. Y—Tin of Lefferts and Stevens ink.

Defendant's Ex. Z—Sample of high boiling petroleum fraction obtained according to the Doughty patent.

Defendant's Ex. O-1—September 1931 issue of "Metal Progress."

Defendant's Ex. Q-1 id.—Six page folder "Believe it or not."

Defendant's Ex. V-1—Magazine offered in the deposition of witness Pellinger.

Defendant's Ex. W-1—Issue of "Metal Progress" dated January 1932.

Defendant's Ex. X-1—Issue of January 1932 "Your Garden and Home."

Defendant's Ex. Y-1—Issue of February 1932 "Your Garden and Home."

Defendant's Ex. Z-1—Issue of March 1932 "Your Garden and Home."

Defendant's Ex. B-2—Metal can marked Sinclair & Carroll Company "Rotary Yellow, 1st Down, No. 20805."

Defendant's Ex. C-2—Metal can marked "Rotary Red, Second Down, No. 20806."

Defendant's Ex. D-2—Metal can marked "Rotary Black, Third Down, No. 20807."

Defendant's Ex. E-2—Metal can marked "Rotary Blue, 4th Down, No. 20808."

Defendant's Ex. LLL—Sheet of paper referred to by the witness Carroll as a "draw down."

Defendant's Ex. M-2—Certified copy of the filewrapper of the application serial No. 15,944 filed April 21, 1935, referred to in line 30, column 2 of page 2 of the patent in suit.

Defendant's Ex. S-2—Samples of Alchemic Gold printing identified by the witness Satenstein.

Dated, November 29, 1943.

(Sgd.) ROBERT W. BYERLY,
Attorney for Plaintiff-Appellant,
225 Broadway,
New York, New York.

(Sgd.) HOGUET, NEARY & CAMPBELL,
Attorneys for Defendant-Appellee,
90 Broad Street,
New York, New York.

By WALTER H. FREE.

It is so ordered:

.....
U. S. C. J.

Dated: ....., ...

Stipulation Regarding Record on Appeal.

IT IS HEREBY STIPULATED AND AGREED by and between counsel for the respective parties hereto as follows:

1. The record on appeal shall include the transcript of all evidence taken at the trial herein, including all depositions offered at the trial herein in question-and-answer form, less the following:

(a) The opening statements of counsel.

(b) Colloquies between counsel and arguments to the court on questions of evidence.

(c) The closing statements of counsel.

2. Said record on appeal shall also include the following:

(a) The pleadings herein.

(b) The statement required by Rule 13 of the Circuit Court of Appeals.

(c) The decision of the Honorable John Foster Symes.

(d) The findings of fact and conclusions of law.

(e) The judgment herein.

(f) The plaintiff's motion for a new trial, supporting and opposing affidavits.

(g) The decision of the Honorable J. Foster Symes on plaintiff's motion for a new trial.

(h) The order denying plaintiff's motion for a new trial.

(i) The notice of appeal.

(j) The orders extending time to docket appeal.

(k) The order regarding exhibits.

Stipulation Regarding Record on Appeal.

(l) The stipulation regarding record on appeal.

(m) This stipulation.

(n) The stipulation as to correctness of record.

(o) Certificate of Clerk.

3. IT IS FURTHER STIPULATED AND AGREED that the record on appeal shall include all of the exhibits offered at the trial herein, provided, however, that it is stipulated that the following paper exhibits need not be reproduced and included in the printed record on appeal but that appellant shall furnish three copies of such omitted paper exhibits, properly bound up, to the Circuit Court of Appeals at the argument of the appeal herein and will furnish an additional copy to counsel for the appellee:

Plaintiff's Ex. 13—Graph testified to by the witness Bragdon.

Plaintiff's Ex. 18—Diagram testified to by the witness Hurley.

Plaintiff's Ex. 20—Formulæ cards for the nitrocellulose lacquer having laboratory code number 895-1, and the manufacturing code number W4608.

Plaintiff's Ex. 34—Copy of pamphlet entitled "Report of Committee on Standardization of Petroleum Specifications 'Bulletin No. 5' ".

Plaintiff's Ex. 35—United States Government specifications testified to by the witness Taylor.

Plaintiff's Ex. 36—Catalogue of the Hilton Davis Company (cover and pp. 53, 54).

Plaintiff's Ex. 45—Chart testified to by witness Bragdon as showing the same curve as shown in Taylor's Exhibit B-1 in the upper line drawn in red.

Plaintiff's Ex. 46—Graph indicating the witness Bragdon's determination of the boiling point of the I. P. I. solvent.

Plaintiff's Ex. 47—Graph drawn by the witness Bragdon to show the comparison between the curves.

Plaintiff's Ex. 48—Photostat of pages from the book entitled "Petroleum".

Plaintiff's Ex. 50 id.—Proof of the vapor pressure of the kerosene about which the witness Bragdon testified.

Plaintiff's Ex. 51 id.—Chart showing the boiling range of the kerosene at about 250 made and testified to by the witness Bragdon and the kerosene above 250 given by Mr. Taylor on Exhibit B-1.

Plaintiff's Ex. 54—Barrett Company's catalog (index, title page and page 12).

Plaintiff's Ex. 55—Chart showing the witness Bragdon's determination of defendant's 502-C ink oil, the I. P. I. petroleum solvent mentioned in Defendant's Exhibit B-1.

Plaintiff's Ex. 56—Chart showing that the vapor pressure of oil of cassia at 20 degrees is about .2 of a millimeter.

Plaintiff's Ex. 61—Schematic drawing showing the vapor pressure measuring apparatus in the plaintiff's laboratories.

Plaintiff's Ex. 62—Notebook which the witness Gessler kept of his work when he was the chief chemist of the Zinsser Company (3 pages relating to Experiment 842B; 4 pages relating to Experiment 842C; and 2 pages relating to Experiment 842E).

Plaintiff's Ex. 67—Smudged Montgomery Ward sheet.

Defendant's Ex. A—Set of curves referred to by the witness Bragdon.

Defendant's Ex. D—Memorandum testified to by the witness Hayward.

Defendant's Ex. J—Photostatic copy of the Brewer and Gardner article.

Defendant's Ex. K—Photostatic copy of the original of Chemical Society for 1888, pages 42-45 inc., which is referred to in the footnote 6 of the Brewer and Gardner Article.

Defendant's Ex. L-1, L-2, L-3—Photographs of the apparatus used by the witness Taylor to determine the vapor pressure characteristics of certain solvents.

Defendant's Ex. M—Report of Mr. Taylor on the vapor pressure of oil of cloves.

Defendant's Ex. N—Data sheet made by the witness Taylor in determining the vapor pressure for butyl carbitol.

Defendant's Ex. O—Chart referred to by the witness Taylor.

Defendant's Ex. P—Set of curves identified by the witness Taylor.

Defendant's Ex. Q—Set of curves showing solvents obtained from Lefferts and Stevens patent, including butyl carbitol and defendant's 502-C oil.

Defendant's Ex. W—Photograph illustrating the still used by the witness Taylor to obtain the petroleum fraction mentioned in the Doughty patent.

Defendant's Ex. X—Report of Mr. Taylor on the vapor pressure of kerosene fraction.

Defendant's Ex. A-1—Invoice and order identifying the kerosene used by the witness Taylor in making the solvent according to the Doughty patent.

Defendant's Ex. B-1—Distillation range chart testified to by the witness Taylor.

Defendant's Ex. C-1—Photograph of the standard equipment used for an A. S. T. M. distillation range test.

Defendant's Ex. D-1—Chart indicating the vapor pressures at various temperatures.

Defendant's Ex. E-1—Chart which is an enlargement of the vapor pressure chart given in "Industrial and Engineering Chemistry".

Defendant's Ex. F-1—Print from a Montgomery-Ward catalog bearing the signature of the witness Taylor.

Defendant's Ex. G-1—Pages 316 and 317 of the 1942 Pharmacopeia of the United States of America and page 235 of the 1882 volume of the United States Pharmacopeia.

Defendant's Ex. I-1—Straight line vapor pressure chart made and testified to by the witness Taylor.

Defendant's Ex. J-1—Photostatic copies of pages 352 and the fly-leaf of the Mellon Institute book published in 1920.

Defendant's Exs. K-1, K-2, K-3, K-4—Four invoices dated January 2, January 29, January 30, and February 15, 1941, from Magic Brothers Petroleum Products to Sinclair & Carroll Company, Inc.

Defendant's Ex. LL—Laboratory report marked "Laboratory No. 144,560 dated July 1, 1941 to Magic Bros. Oil Co., From Phoenix Chemical Laboratory, Inc."

Defendant's Ex. M-1—Fly-leaf and pages 124-128 inc. of Nelson's book entitled "Petroleum Refinery Engineering, First Edition" published in 1936.

Defendant's Ex. N-1—Card produced by the witness Theuer showing the first printing of the September 1930 "Metal Progress".

Defendant's Ex. P-1—Printing record testified to by the witness Theuer.

Defendant's Ex. R-1 id.—Formula for Jirousek ink.

Defendant's Exs. S-1, T-1—Order and reorder of the Commercial Printing & Litho Company.

Defendant's Ex. U-1—Sales slip of the A. L. Garber Company dated March 2, 1932.

Defendant's Ex. A-2—Invoice dated November 18, 1942, from Sinclair & Carroll to W. F. Hall Printing Co.

Defendant's Ex. F-2—Card dated November 3, 1942, entitled "Heat Set Varnish No. 20798".

Defendant's Ex. G-2—Formula card dated November 5, 1942, marked "Rotary Yellow, 1st Down, No. 20805".

Defendant's Ex. H-2—Formula card marked "Rotary Red, 2nd Down, No. 20806", dated November 5, 1942.

Defendant's Ex. I-2—Formula card dated November 5, 1942, marked "Rotary Blue, 4th Down, No. 20808".

Defendant's Ex. J-2—Formula card dated November 5, 1942, marked "Rotary Black, 3rd Down, No. 20807".

Defendant's Ex. KK—Montgomery Ward Christmas book of 1942, page 59.

Defendant's Ex. O-2—Article in Industrial and Engineering Chemistry for July 1926 which was referred to in the filewrapper of the patent in suit.

Defendant's Ex. R-2—Comparative curves between butyl carbitol, the plaintiff's and defendant's solvent.

Defendant's Ex. U-2—1929-1930 Carbide & Carbon Chemicals Corporation catalog (title page, table facing page 7 and pages 16, 17).

IT IS FURTHER STIPULATED that the following exhibits may be regarded as physical exhibits and need not be reproduced by appellant:

Plaintiff's Ex. 6—Sample of ink with an alcohol solvent used by the witness Bragdon.

Plaintiff's Ex. 7—Film of ink on paper, the ink being that of Exhibit 6.

Plaintiff's Ex. 8—Second ink sample used by the witness Bragdon, being ink whose solvent is butyl acetate, having a vapor pressure of 1½ centimeters at room temperature.

Plaintiff's Ex. 9—Film made with ink (Exhibit 8).

Plaintiff's Ex. 10—Butyl carbitol ink.

Plaintiff's Ex. 11—Paper.

Plaintiff's Ex. 12—Sheet which the witness Bragdon placed on top of Exhibits 7 and 9.

Plaintiff's Ex. 15—Print testified to by the witness Cray as being the first heat-drying ink he saw.

Plaintiff's Ex. 16 id.—Memorandum in the handwriting of Dr. Dufford.

Plaintiff's Ex. 17—Sheet of November 12, 1932 belonging to Mr. Finne.

Plaintiff's Ex. 19—Sales invoices testified to by the witness Blackmore.

Plaintiff's Ex. 29—Series of invoices from the International Printing Ink Corporation running from December 19, 1933 to January 29, 1936

Plaintiff's Ex. 30—Group of invoices running from August 12, 1936, through November 18, 1942, showing purchases made from the International Printing Ink Company

Plaintiff's Ex. 31—Copies of formulae testified to by the witness Jeuck

Plaintiff's Ex. 32—Copies of formulae MX-3858 and MX-3859

Plaintiff's Ex. 39—Sheet from Life Magazine testified to by witness Busby as having been printed on one side

Plaintiff's Ex. 40—Sheet which was printed with heat-set inks on Press 89

Plaintiff's Ex. 41—Sheet testified to by witness Busby as having been printed on Press 100

Plaintiff's Ex. 42—Sheet which was printed on a 2-color Life 64 page press

Plaintiff's Ex. 43—Single-color heat set signature printed on a 64-page Life Press.

Plaintiff's Ex. 44—Single-color signature for Time Magazine printed on a 64-page Time press

Plaintiff's Ex. 58—Ink prepared in accordance with the formula of the Doughty patent, containing four parts of terpineol, 1 part of rosin and 10 parts of bronze powder

Plaintiff's Ex. 60—Ink vehicle of the McElroy patent produced by the witness Bragdon

Plaintiff's Ex. 66 id.—Catalogs of the Carbide & Carbon Chemicals Corporation from 1930 to 1935

Defendant's Ex. H—Piece of paper on which the witness Taylor made demonstration

Defendant's Ex. I—Cardboard having on it four samples of printing, testified to by the witness Taylor

Defendant's Ex. R—Sample container of defendant's solvent in the ink which is claimed to infringe

Defendant's Ex. S—Sample of the ink which was made up in accordance with the Doughty patent

Defendant's Ex. T—Sample of the Doughty ink produced by Mr. Taylor

Defendant's Ex. U—Sample of the Gessler ink

Defendant's Ex. V—Sheet identified and described by the witness Taylor

Defendant's Ex. Y—Tin of Lefferts and Stevens ink

Defendant's Ex. Z—Sample of high boiling petroleum fraction obtained according to the Doughty patent

Defendant's Ex. O-1—September 1931 issue of Metal Progress

Defendant's Ex. Q-1 id.—Six-page folder "Believe it or Not"

Defendant's Ex. V-1—Magazine offered in the deposition of witness Pellinger

Defendant's Ex. W-1—Issue of Metal Progress dated January 1932

Defendant's Ex. X-1—Issue of January 1932 "Your Garden and Home"

Defendant's Ex. Y-1—Issue of February 1932 "Your Garden and Home"

Defendant's Ex. Z-1—Issue of March 1932 "Your Garden and Home"

Defendant's Ex. B-2—Metal can marked Sinclair & Carroll Company "Rotary Yellow, 1st Down, No. 20805"

Stipulation Regarding Record on Appeal.

Defendant's Ex. C-2—Metal can marked "Rotary Red, Second Down, No. 20806"

Defendant's Ex. D-2—Metal can marked "Rotary Black, Third Down, No. 20807"

Defendant's Ex. E-2—Metal can marked "Rotary Blue, 4th Down, No. 20808"

Defendant's Ex. LLL—Sheet of paper referred to by the witness Carroll as a "draw down"

Defendant's Ex. M-2—Certified copy of the filewrapper of the application serial No. 15,944 filed April 21, 1935, referred to in line 30, column 2 of page 2 of the patent in suit

Defendant's Ex. S-2—Samples of Alchemic Gold printing identified by the witness Satenstein

4. The appellant shall file with the District Court two printed copies of the record on appeal herein constituted as above stipulated simultaneously with the filing of the printed record in the Circuit Court of Appeals.

Dated, November 29, 1943

(Sgd.) Robert W. Byerly,
Attorney for Plaintiff-Appellant,
225 Broadway,
New York, New York.

(Sgd.) Hoguet, Neary & Campbell,
Attorneys for Defendant-Appellee,
90 Broad Street,
New York, New York.

By Walter H. Free,
Member of said Firm.

Stipulation as to Correctness of Record.

IT IS HEREBY STIPULATED AND AGREED by and between counsel for the respective parties hereto that the foregoing pages, together with the book of exhibits filed herewith, constitute a true and correct transcript of the record of the District Court in this case as agreed to and stipulated by the parties hereto in accordance with the provisions of Rule 75 (f) of the Federal Rules of Civil Procedure.

Dated February 1, 1944.

ROBERT W. BYERLY,
Attorney for Plaintiff-Appellant,
225 Broadway,
New York, New York.

HOGUET, NEARY & CAMPBELL,
Attorneys for Defendant-Appellee,
90 Broad St.,
New York, New York.

By WALTER H. FREE.
Member of said Firm

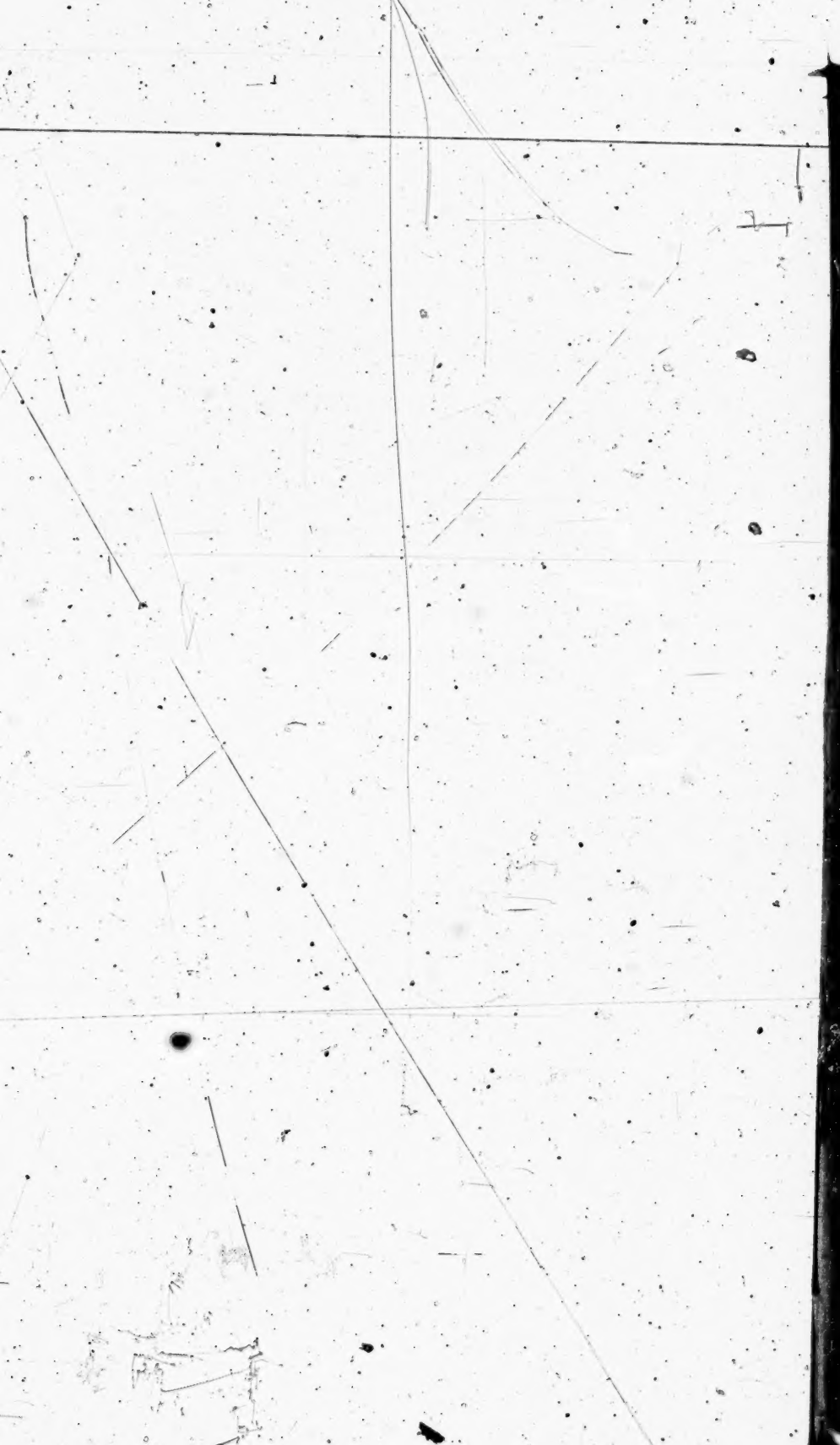
Clerk's Certificate.

UNITED STATES OF AMERICA,
SOUTHERN DISTRICT OF NEW YORK, } ss.:

I, GEORGE J. H. FOLLMER, Clerk of the District Court of the United States of America for the Southern District of New York, do hereby certify that the foregoing is a correct copy of the transcript of the record of the said District Court in the above entitled matter as agreed to by the parties.

IN TESTIMONY WHEREOF, I have caused the seal of said Court to be hereunto affixed at the City of New York, in the Southern District of New York, this 1st day of February in the year of our Lord, One thousand nine hundred and forty-four and of the Independence of the said United States, the one hundred sixty

GEORGE J. H. FOLLMER
Clerk



[fol. 1094] UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SECOND CIRCUIT, OCTOBER TERM, 1943.

No. 336

(Argued May 10, 1944. Decided August 28, 1944)

INTERCHEMICAL CORPORATION, Plaintiff-Appellant,

against

SINCLAIR & CARROLL COMPANY, INC., Defendant-Appellee

Before Swan, Augustus N. Hand and Clark, Circuit Judges

Appeal from the United States District Court for the Southern District of New York

From a decree in a suit by the plaintiff, Interchemical Corporation, against the defendant, Sinclair & Carroll Company, Inc., for infringement of U. S. Patent No. 2,087,190, adjudging the patent invalid and not infringed, the plaintiff appeals. Reversed.

Robert W. Byerly and Ralph M. Watson, Counsel for Plaintiff-Appellant.

Hoguet, Neary & Campbell, Attorneys for Defendant-Appellee; Walter H. Free, Counsel.

[fol. 1095] AUGUSTUS N. HAND, *Circuit Judge*:

This is a patent suit brought by the Interchemical Corporation, assignee of U. S. Patent No. 2,087,190 to Gessler, against Sinclair & Carroll Company, Inc. Claims 3, 10, 11, 12 and 13 are in issue. The District Court held the patent invalid and not infringed as to those claims. The plaintiff Interchemical Corporation, appeals. We think that the claims are valid and infringed and that the decree should, therefore, be reversed.

The Gessler patent is for a printing ink and is directed to the composition of the ink and not to any method of printing. The great advantage of the Gessler ink is that it enables printing to be done on high grade non-absorbent paper with a smooth surface very rapidly and without smudging. The ink used is a volatilizable ink and differs from the inks which were in general use for printing formerly and are

still widely employed, the liquid part of which is linseed oil. Linseed oil cannot be volatilized and will only harden after a considerable time by absorbing oxygen from the air—a slow process requiring many hours for completion. In printing newspapers the drying of a linseed oil ink was not difficult because the soft paper used absorbed the ink when one side of the paper was printed and held it in position until after the back side of the sheet was printed in spite of the fact that the ink on the front side had not dried.

A different problem arose in printing on the smooth non-absorbent papers which are used for magazines. Such papers will not take up and hold the ink and the wet ink printed on one side is likely to be smudged by the ink on the other side. It was at first sought to correct this difficulty by running a separate web of "treated manila" through the press underneath the web of the paper that had been printed for the purpose of protecting the wet ink on the first side at the time when the second impression was [fol. 1096] being made. There were various other attempts to prevent smudging when linseed oil was used in the ink and at the same time to maintain a high speed in printing, but it remained impossible to print on smooth paper in a high speed press until an ink was discovered that would dry instantly when the proper time arrived. We think this discovery was made by Gessler. He discontinued the use of linseed oil in his ink and demonstrated the advantages of an ink that would volatilize rapidly instead of slowly oxidizing and would also retain its original consistency unchanged during its travel over a long series of ink rollers.

Volatilizable inks had before been used in rotogravure printing in which the ink was deposited on the paper from engraved recesses in the printing cylinder. But it was unnecessary in that process to maintain the original consistency of the ink unchanged while it was passing over a long series of rollers. The rotogravure cylinder rotates through a trough of ink, a steel doctor blade scrapes the excess ink off and the balance that is in the pockets below the surface is transferred onto the paper. As the witness Cray said there is "no question of rollers at all" (Record, p. 97). Metallic inks which were dried by evaporation had likewise been used for stamping letters on book bindings. These inks, like those used in the rotogravure process, contained no linseed oil but had a solution consisting of a solid

binder such as resin dissolved in a liquid solvent which boiled off at the temperature to which the printing die was heated.

We think the record clearly establishes that the trade had long striven to secure an ink that would maintain its consistency on the rollers until the web was imprinted and would then instantly dry on application of a sufficient amount of heat but had never succeeded in obtaining such an ink until Gessler made his invention. As a result his ink has been widely used on high speed printing presses [fol. 1097] and is regularly employed in printing such magazines as the "Saturday Evening Post," "Life," the "New Yorker" and "Colliers."

The specification of the Gessler patent refers to the delay in drying the ink and the difficulty in avoiding smudging where inks had been made with oils. It then refers to the use of cellulose lacquers having such a high degree of volatility that they hardened on the rollers of the press and failed to make a "satisfactory impression * * * on the material to be printed." Gessler describes his invention thus:

> "I have discovered * * * that if * * * cellulose compounds, particularly nitrocellulose, are dissolved in solvents with high boiling points, this difficulty may be avoided. * * *
>
> "The referred to solutions, * * * are characterized by their very low rate of evaporation at temperatures approximating room temperature and by their ability to manifest a relatively high degree of volatility when subjected to temperatures higher than room temperature. The solvents or solvent mixtures utilized in the formation of these solutions may be described as solvents having a high boiling point combined with a low vapor pressure at room temperature, but yet further characterized by a rapid rise in their vapor pressure curves upon elevation of the temperature,—that is, by their property of evaporating quickly from a thin layer, as in a print, when the temperature is sufficiently raised. Among this peculiar class of solvents I have found as an example diethylene glycol monobutyl ether to be a solvent for nitro-cellulose and many natural and artificial gums, very well adapted to the purposes of this invention. This solvent at room

temperatures remains fluid and moist for a long period of time. When heated to about 100° C. or above, the [fol. 1098] rate of vaporization is greatly accelerated and, when used in the ink of this invention, produces a print which dries almost instantaneously when subjected to such a heat treatment.

* * * * * * *

"With ink prepared as above, the printing operation may be carried out in the ordinary manner and at ordinary temperatures. At the conclusion of the printing operation, the printed materials may be subjected, in known manner, to sufficient heat to dry the thin film of the print very rapidly. Thus a finished print is obtained immediately at the end of the printing and heating operation and no time, labor, nor material is wasted in delays incident to the prolonged drying of the printed goods under the processes at present in use."

The third claim which contains the important elements of the others in suit reads as follows:

"3. A printing ink which is substantially non-drying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component completely dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink—the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, substantially all of the liquid component having a vapor pressure at 20° C. as low as that of diethylene glycol monobutyl ether at 20° C., and the major part of the liquid component having a vapor pressure which at 150° C. approximates that of ethyl alcohol at ordinary temperatures and forming a stable solution with the solid component."

[fol. 1099] The claims of the patent in suit, which are relied on, were held by the District Court to have been anticipated by:

Lefferts and Stevens U. S. Patent No. 380,654, April 3, 1888

Doughty U. S. Patent No. 1,439,696, December 26, 1922

McElroy & Clarke U. S. Patent No. 1,450,692, April 3, 1923

Jirousek U. S. Patent No. 1,954,627, April 10, 1934

Hanson Article of December, 1931.

The Lefferts Patent

This is an old patent issued in 1888 and, therefore, a most unlikely reference in an art which shows a vain striving for many years thereafter to obtain a quick drying ink for ordinary printing. The Lefferts patent disclosed oil of cassia as a solvent. It was a natural mixture coming from the interior of China. There is no proof of what its vapor pressure was at the time when Lefferts applied for his patent. In other words, it was not a standard product and this is evident from the great variation of the vapor pressure of some of the samples of oil of cassia purchased in 1938 from the vapor pressure of butyl carbitol and the substantial correspondence of the vapor pressure of samples purchased in 1942. There is nothing in the Lefferts patent to show the critical vapor pressure of his solvent at room temperature or at temperatures at which it would vaporize. He says that for type printing the ink should be "of a slow drying nature," but does not say how slow. Nitro-benzole is also mentioned in the Lefferts patent among [fol. 1100] proposed solvents, but defendant's expert admitted that its vapor pressure is at least ten times that of butyl carbitol (Record p. 332).

Doughty and McElroy & Clarke Patents

These patents related to metallic pigment inks for application to bookbinding by means of a heated die. The inks were to take the place of the old process of affixing gold leaf. The metallic pigments were dispersed in a solvent of terpineol combined with a resinous substance as a thickening agent. Doughty in his specification says:

> "The ink dries very slowly at atmospheric temperature owing to the high boiling point of the volatile solvent. It dries rapidly, however, when applied with a heated die. * * * The ink described, though particularly suitable for book-binders' use, will serve other purposes of decorative printing."

Satenstein, the president of Alchemic Gold Company, testified that the ink was only used for stamping and was not satisfactory for ordinary printing. His company was an assignee of the Doughty and McElroy & Clarke patents, and sold them to Frederick H. Levey & Company, reserving however to itself the right to manufacture, sell and use them in stamping as distinguished from letter press and intaglio printing. The purchase of Levey & Company of rights under the Doughty patent was after it had succeeded in making an ink derived from the teachings of Gessler but which it hoped did not fall within the claims of his patent.

The terpineol which Doughty and McElroy & Clarke described as their solvent had a vapor pressure two or three times as high as that of butyl carbitol. When appellee made a test to prove the advantages of the Doughty and McElroy [fol. 1101] & Clarke inks he used 33⅓% of terpineol and 66⅔% of resin oil instead of the 95% of terpineol and 5% of resin oil recommended by McElroy & Clarke.

It is true that Doughty mentioned terpinyl acetate as among suitable solvents and that solvent has the same vapor pressure as butyl carbitol. But there was nothing in the patent to indicate that the vapor pressure of terpinyl acetate should be chosen for a quick drying ink for ordinary printing and the specification did not and could not indicate any satisfactory formula for such printing that would at once embrace this ingredient and terpineol which differed so widely in vapor pressures.

We cannot regard these patents which had contributed nothing to the ordinary printing art though they had issued about ten years prior to the Gessler patent as references that ought to defeat his invention.

The Jirousek Patent

This patent provides for an ink containing a large amount of linseed oil and clearly is not a proper reference against the Gessler patent.

The Hanson Article

This publication described the kind of ink desired by printers but not the way to get it or its composition.

Other patents discussed in the defendant's brief were U. S. Patent No. 1,752,462 to Smith, U. S. Patents Nos. 1,858,673 and 1,954,450 to Lawrence and U. S. Patent No. 1,806,965 to Clewell.

The Smith patent was intended for metallic inks to be used for stamping letters on book-bindings. It listed terpinyl acetate among various recommended solvents but, like the patent to Doughty already dealt with, mentioned [fol. 1102] terpineol as the solvent of most standard use. It contained no data as to the vapor pressure at room temperature of the particular solvent which might be selected or as to its vapor pressure when heated to 150° C., and the vapor pressures of terpineol and terpinyl acetate widely differed.

The Lawrence patents were not introduced as anticipations of Gessler but only to show that butyl carbitol, which is mentioned in each patent as a solvent, was known some years before the date of Gessler's invention. Each patent dealt with ink transfers upon fabrics known as decalcomania. The first gives a formula in which the solvent butyl carbitol represents 45 parts as compared with 300 parts in Gessler's ink. The ink made under either Lawrence patent would be a thick wax-like paste unfitted for ordinary printing. The specification of the second Lawrence patent shows a confusion and lack of understanding of vapor pressures for it says that: "Butyl-carbitol has a high vapor pressure at about 100° C, so that it does not evaporate with sufficient rapidity to substantially vary the composition of the marking material."

The Clewell patent was before the Patent Office, as was the Doughty patent, and the Gessler claims were nevertheless allowed. It mentions diethylene glycol as an ink solvent, but that solvent was only usable when combined with a stabilizer because it was too hydroscopic.

We hold that none of the patents of the prior art foreshadowed Gessler's invention which, as he say in line 20, column 2, p. 1 of his patent: "involves a recognition of the principle that some * * * high boiling solvents exhibit, at temperatures elevated above room temperatures, such a remarkable and quick increase in their vapor pressure that they volatilize rapidly, while at the same temperatures other show little change in their vapor pressures and therefore are practically non-volatile." He pointed out the critical vapor pressures necessary to achieve his result and [fol. 1103] furnished the art with a formula that would tell printers how to avoid difficulties that had beset them for years.

But the defendant argues and secured a finding to the effect that the patent in suit contains claims and disclosures made more than two years after public use of Gessler's ink. It relies on a sale in April 1933 of the ink described and an amendment which Gessler introduced in his specification on September 28, 1935, as the defendant insists, to cover butyl carbitol acetate which had a lower vapor pressure than butyl carbitol. It seems to us however that the mention of ethyl alcohol in the amendment for the purpose of indicating the vapor pressure butyl carbitol was to approximate at a temperature of 150° C. did not alter the invention and was different from introducing claims not previously described as was done in *Muncie Gear Co.* v. *Outboard Co.*, 315 U. S. 759.

The last question is whether the ink used by the defendant on its presses infringed the claims in issue of the Gessler patent. In our opinion it did. Most of the plaintiff's like the defendant's inks substituted a selected narrow cut of petroleum as a solvent in place of butyl carbitol. It was equally efficacious and much less expensive. The plaintiff's ink was checked for vapor pressure with Gessler's original solvent (Record p. 85). The defendant did not begin to make a heat set ink until 1938. It made the infringing ink for a customer after the plaintiff's ink had previously been on the market. Both the plaintiff and defedant and the Frederick Levey Company all made inks having a high boiling petroleum cut as a solvent after Gessler's invention had blazed the way. It is true that Doughty said in his patent that: "certain higher boiling liquid saturated paraffin hydrocarbons, e.g., those present in fractions of kerosene boiling about 250° C. at normal pressure may be employed instead of terpineol." We think that the plaintiff is right, however, in saying that this fur-
[fol. 1104] nished no adequate teaching for the substitution of a workable cut of petroleum as a solvent in the place of butyl carbitol.

Gessler made an ink employing butyl carbitol as a solvent and this solvent was used successfully in May 1932, by the Peterson Parchment Paper Company. In November, 1932 and during a part of 1933 the Cray-Finne Company using a like solvent obtained from the Zinnser Company, of which Gessler was the Chief Chemist, made up an ink, sold it to

the Curtis Publishing Company and witnessed its successful operation on the presses of the latter. But, after a time the butyl carbitol ink tended to crack the glue-glycerine rollers used by Curtis, so that Gessler substituted butyl carbitol acetate as a solvent, which had no deleterious effect on the rollers. The butyl carbitol ink was also sold in 1933 by the Manufacturer's Printing Company to the Vegetable Parchment Paper Company of Kalamazoo, Michigan and worked satisfactorily and without injury to the rubber rollers which the Kalamazoo Company had in its presses. In the meantime, the Frederick H. Levey Company which furnished most of the printing ink to Curtis, developed an ink similar in operation to the Gessler ink, which it had obtained from the Cray-Finne Company. It employed a high boiling petroleum product as a solvent resulting in a less expensive ink than the one in which butyl carbitol acetate was used. Mr. Cray of the Cray-Finne Company had informed the Curtis Company of the ingredients of the inks he had sold to the latter some three or four months before he saw the ink with the petroleum solvent running on the Curtis presses. This development was followed by the making of a similar ink by the plaintiff, in which a petroleum cut was used instead of butyl carbitol or butyl carbitol acetate.

It is argued that the use of a petroleum cut as a solvent was anticipated by the suggestion of kerosene for use in [fol. 1105] that capacity in the Doughty patent, but the composition of kerosene had changed since 1922 when the Doughty patent issued. Moreover kerosene is a mixture of a large number of different hydrocarbons with different degrees of volatility, whereas the vapor pressure of butyl carbitol is substantially constant during evaporation. The specially prepared petroleum solvents employed by the plaintiff and also by the defendant were introduced in the three petroleum inks after the information derived from the Gessler invention had become available and its teaching could serve as a basis for trying experiments with a solvent that had the characteristics of butyl carbitol and was much less expensive. In holding that the defendant followed the teachings of Doughty rather than those of Gessler, the District Court ignored these considerations as well as the testimony of Satenstein that the Doughty ink would not work for ordinary printing.

Finally, it is argued that the vapor pressure of the ink solvent of the defendant at 150° C. (known as 502-C.) does not approximate that of ethyl alcohol at ordinary temperature. The specification gives the vapor pressure of butyl carbitol at 150° C. as 6 cm., and of ethyl alcohol at ordinary temperatures as 4 cm. In our opinion, the vapor pressure of the defendant's solvent approximates that of ethyl alcohol within the meaning of that word as used in the claims. That the word "approximates" gives lee-way of at least 2 cm., is plain, since the vapor pressure of the solvent especially recommended in the specification was 6 cm., at 150° C., that is to say, 2 cm. greater than the pressure of ethyl alcohol at ordinary temperature. In other words, the vapor pressure of butyl carbitol is as close to the vapor pressure of ethyl alcohol, as is the vapor pressure of the defendant's solvent. The degree of difference that was regarded as precluding an approximation is illustrated by the solvent dibutyl pthalate mentioned at page 2, line 9, of the Patent as [fol. 1106] being a pressure of only .14 cm. at 150° C. and evaporating slowly. When the patent says that at 150° C. the vapor pressure of the solvent must approximate that of ethyl alcohol, it means approximate it for the purpose in question, that is, for making the ink dry quickly. This the defendant's solvent does.

Inasmuch as the defendant's ink was undoubtedly compounded with Gessler's teaching in view and the latter's device involved a highly important step in the art, it is only reasonable to hold that it is within the claims of the patent relied on. To employ an ink that would retain its consistency until the paper was imprinted and then would instantly dry on the application of an amount of heat not injurious to the paper, involved more than ordinary talent. By recognizing that some high boiling solvents volatilize rapidly upon a rise of temperature, while others remain practically non-volatile, and by defining the class useful for the purposes desired, Gessler satisfied a long felt want. He made an ink that was not the product of a pedestrian worker in a laboratory but of a chemist of imagination who was able to conceive of and employ a solvent that had the apparently inconsistent attributes of maintaining the consistency of the ink until it had passed over the rollers and

had done the printing and of then instantly evaporating, upon the application of heat, so that its surface would be dry and not rub off. We hold that Gessler devised such an ink and that his discovery was an invention for which a patent was justly awarded.

The Decree is reversed with directions to grant a judgment sustaining the claims in issue and holding them infringed, with the usual injunction and reference.

1105

United States Circuit Court of Appeals

For the Second Circuit

No. 336 — October Term, 1943

INTERCHEMICAL CORPORATION
Plaintiff-Appellant

v.

SINCLAIR & CARROLL COMPANY, INC.
Defendant-Appellee

PETITION FOR REHEARING

HOGUET, NEARY & CAMPBELL
Attorneys for Petitioner

WALTER H. FREE
MARK N. DONOHUE
Of Counsel

INDEX

PAGE

The Court, in adjudging Gessler patent No. 2,087,190 to be valid, overlooked the controlling factor that the compounding of Gessler's ink, regardless of novelty, did not amount to invention 1

The Court, in adjudging Gessler's patent to be infringed, construed Gessler's claims so broadly as to render them invalid under the Statute (U. S. C., Title 35, Sec. 33) for indefiniteness 7

CASES CITED

Boston Pencil Pointer Co. v. Automatic Pencil Sharpener Co. (C. C. A. 2, 1921), 276 Fed. 910 2

Cuno Engineering Corp. v. Automatic Devices Corp., 314 U. S. 84 2

Dwight & Lloyd Sintering Co. v. Greenawalt (C. C. A. 2, 1928) 27 F. (2d) 823 8

H. K. Regar & Sons Co. v. Scott & Williams (C. C. A. 2, 1933) 63 F. (2d) 229 4

Ruben Condenser Co. v. Aerovox Corporation (C. C. A. 2, 1935) 77 F. (2d) 266 5, 6

United Carbon Co. v. Binney & Smith Co., 317 U. S. 228 10

Wallace v. F. W. Woolworth Co. (C. C. A. 2, 1943), 133 F. (2d) 763 4

Webster Co. v. Splitdorf Co., 264 U. S. 463 8

United States Circuit Court of Appeals

For the Second Circuit

No. 336 **October Term, 1943**

INTERCHEMICAL CORPORATION,
Plaintiff-Appellant,

v.

SINCLAIR & CARROLL COMPANY, INC.,
Defendant-Appellee.

PETITION FOR REHEARING

Your petitioner, Sinclair & Carroll Company, Inc., Appellee in the above-entitled appeal, prays for a rehearing in this appeal, decided adversely to Appellee on August 28, 1944.

The grounds upon which this petition is based are:

1. The Court, in adjudging Gessler patent No. 2,087,190 to be valid, overlooked the controlling factor that the compounding of Gessler's ink, regardless of its novelty, did not amount to invention.

The Court's discussion of the issue of validity of Gessler's patent is directed principally to the question of whether or not Gessler's ink is novel—whether or not it was *anticipated* by the prior art patents and publications upon which petitioner relied at the trial. The Court determined that question—novelty—in respondent's favor.

Petitioner does not agree that Gessler's ink is not anticipated; but does not propose to reargue that issue here.

Petitioner does respectfully contend, however, that the Court has overlooked certain uncontroverted and admitted evidence of record which requires the finding that the compounding of Gessler's ink, regardless of novelty or lack of novelty, did not attain the dignity of invention. As Judge Hough wrote in *Boston Pencil Pointer Co.* v. *Automatic Pencil Sharpener Co.* (C. C. A. 2, 1921) 276 Fed. 910, 912, "novelty, however great, can never be put in the place of invention." The same principle was emphatically restated by the Supreme Court in *Cuno Engineering Corp.* v. *Automatic Devices Corp.* (1941) 314 U. S. 84, 90.

In considering the issue of invention, it does not oversimplify the facts to state that Gessler's contribution consisted only in substituting butyl carbitol (or other solvents having substantially the same vapor pressure as butyl carbitol) for the solvents theretofore used in printing inks, because the combination of the other ingredients of Gessler's ink is concededly old in the art (I, pp. 55, 95). This premise is affirmed by Gessler's own statement, adopted by the Court, that his patent is predicated upon "a recognition of the principle that some * * * high boiling solvents exhibit, at temperature elevated above room temperatures, such a remarkable and quick increase in their vapor pressure that they volatilize rapidly * * *." (Opinion, p. 2455.)

Inherent in this statement, and borne out by the remainder of Gessler's patent, is the premise, accepted by both petitioner and respondent, that it is the solvent, *per se*, that imparts to Gessler's ink the quick drying characteristics upon which Gessler bases his claims for patentability. In these circumstances we submit that the Court should consider and decide whether invention was required in Gessler's selection and use of the solvent described in his patent and very indefinitely covered by his patent claims.

Gessler cannot and does not deny that the problem (which was *not* original with Gessler) which his patent purports to solve was *merely* the *selection* of a suitable solvent for the cellulose derivatives or resins used in making printing inks. The problem was to find a solvent which would not vaporize at room temperature, but which would vaporize rapidly at the elevated temperatures to which paper is heated after printing.

This same problem had been stated, in so many words, by Hanson in December, 1931, in his article "Plastic Printing Inks for Rapid Drying." Hanson said that the general characteristics required of a quick-drying plastic ink was "one that will not dry in a thin film exposed to room air at 80° F. (26° C.) * * * but merely at a touch of heat after being printed upon the paper dries almost instantly" (II, p. 990, middle of first column). He also gave "the highest practical heat to apply to a printed sheet" as 250° F. (121° C.) and recognized that given a solvent with the proper vapor pressure (evaporation rate) at the two critical temperatures "it would not take us long to compound an ink to meet the general characteristics for a plastic ink set forth above", *viz.*, "one that will not dry in a thin film exposed to room air at 80° F. (26° C.) * * * but merely at a touch of heat after being printed upon the paper dries almost instantly" (II, p. 990, middle of second column).

Curiously enough, Hanson not only stated Gessler's problem earlier, but he also indicated the precise field in which the invention, if any, would reside in the solution of the problem so posed; *i. e.*, the selection of the solvent.

Thus, in July, 1932, when Gessler's application for patent was filed, Gessler's only problem was to select a solvent from those available to him which would have the desired vapor pressure (evaporation rate) characteristics which he wished to impart to his ink, as suggested by Hanson. Gessler's selection was made after the fashion characteristic of the routineer. He neither "*conceived of*" (as may be inferred from the Court's opinion) nor invented the solvent which he ultimately used. He merely

perceived that butyl carbitol (a new solvent developed in 1929 by Carbide and Carbon Chemicals Corporation and then offered and advertised for printing; II, pp. 985-989) had the desired evaporation characteristics. Gessler then *selected* that solvent according to the Carbide and Carbon Corporation's catalog specifications, as he admitted (I, pp. 720-722; II, pp. 985-988; III, Ex. U-2).*

This catalog information showed that butyl carbitol "is an excellent solvent for nitrocellulose and resins * * * with an extremely low rate of evaporation"; that it had the requisite low vapor pressure at room temperature (the catalog listed its vapor pressure at 20° C. as 0.05 mm., hence it clearly was not *volatile* at room temperature; II, p. 988); and that it had a boiling range from 215° C. to 235° C., "intermediate† between the high boiling nitrocellulose solvents and the plasticizers", which indicated to Gessler, as it would to any chemist, a high evaporation rate at elevated temperatures. At most, all that remained for Gessler to do was to determine whether the evaporation rate (vapor pressure) *inherent* in butyl carbitol was sufficiently great to dry (volatilize) rapidly. "When heated to 100° C. or above" (Patent, II, p. 733a, col. 1, ll. 4, 5; I, p. 720).

These circumstances, when given their proper weight, do not justify the conclusion that the District Court erred in finding (II, pp. 1042, 1048) that Gessler's ink was nothing more than a development plainly indicated by the introduction of butyl carbitol on the market in 1929, and, as such, was not a patentable invention.‡ Indeed, we think

---

* Neither Hanson's article, nor the catalogs, nor the advertisement was cited by the Patent Office.

† Gessler and the Court both gave weight to the selection of an "intermediate" solvent; one not having too high or too low a boiling point, just as Hanson prescribed (Opinion, p. 2459; Patent, II, p. 733, col. 2, ll. 10-28; II p. 990, middle of second column).

‡ Also, a new use of an old substance, merely taking advantage of its known attributes, is not invention. *H. K. Regar & Sons v. Scott and Williams* (C. C. A. 2, 1933), 63 F. (2d) 229, 231; *Wallace v. F. W. Woolworth* (C. C. A. 2, 1943), 133 F. (2d) 763, 764).

that the District Court's finding cannot be avoided, without manifest error, in view of the decision of this Court in the closely parallel case of *Ruben Condenser Co.* v. *Aerovox Corporation* (C. C. A. 2, 1935), 77 F. (2d) 266, 267. In the *Ruben* case the invention of the patent there in suit consisted only of substituting glycol in place of glycerin in a dry electrolyte for a dry electrolytic condenser, just as, in the instant case, Gessler's contribution consisted of substituting butyl carbitol (or similar solvents having about the same vapor pressures at 20° C. and 150° C.) for the solvents then in use in printing inks.

In the *Ruben* case, glycol had not been used in a dry electrolyte, but had been used in wet electrolytes, just as, in the instant case, solvents having the same vapor pressures as butyl carbitol had not (according to the Court) been used in ordinary printing inks, but had been used in other kinds of ink (*i. e.*, both the Court and respondent concede that terpinyl acetate which Doughty discloses as a solvent for the ink of his patent has the same vapor pressure as butyl carbitol; Opinion, p. 2454; Respondent's Brief, p. 42).

In the *Ruben* case, as in the instant case, large scale production of the new ingredient suggested by the respective patentees began only a few years before the dates of the alleged inventions. In the instant case, moreover, Hanson, prior to Gessler, had published the *concept* of the Gessler ink and stated clearly that the only problem remaining was the *selection* of a solvent having stated vapor pressure characteristics, which would prevent the ink from "hardening on the rolls, plates or in fountain at room temperature", and which "when heated on the printed sheet to not over 250° F. (121° C.) will dry in a small fraction of a second" (II, p. 990, items 1, 2). Hanson further indicated that when a suitable solvent having his stated vapor pressure (evaporation) characteristics was found, "it would not take * * * long to compound an ink to meet the general characteristics" for rapid drying. In

these circumstances, the following language of Judge Learned Hand in the *Ruben* case in holding the patent there in suit invalid for want of invention seems to us to be controlling here (pp. 267, 268):

> "In the light of all this it seems to us that the patent does not rest upon an authentic invention, but upon one of those steps in an art which demand only patient experiment. Especially in chemistry it is possible to proceed by a system of trial and error, varying formulas by permutation and combination, and recording the results of each. Much that is valuable has been so discovered, and we will not say that the profitable survivals from such elimination can never be inventions; salvarsan for example, as its other name, '606', indicates, was hit upon by this method. Ordinarily invention demands more than that; some resumption of a line of experiment from which the art had looked away (E. I. Dupont De Nemours & Co. *v.* Glidden Co., 67 F. (2) 392, 397 (C. C. A. 2)), some departure which required originality or independence of conception; something more than routine testing of obvious combinations. Here we can find nothing more. * * * If the machine or composition appears shortly after some obstacle to its creation, technical or economic, has been removed, we should scrutinize its success jealously; if at about the same time others begin the same experiments in the same or nearby fields, or if these come to fruition soon after the patentee's, the same is true. Such a race does not indicate invention."

In these circumstances, petitioner respectfully submits that the Court was manifestly in error in failing to sustain the District Court's finding that the Gessler patent as to all claims in suit, is invalid for want of invention.

2. The Court, in adjudging Gessler's patent to be infringed, construed Gessler's claims so broadly as to render them invalid under the Statuté (U. S. C., Title 35, Sec. 33) for indefiniteness.

Gessler's patent discloses but one ink; an ink utilizing butyl carbitol as a solvent from which the ink derives the physical properties claimed for it in the patent.

Originally, and up to September 28, 1935, Gessler's claims were properly limited to what he had disclosed, an ink utilizing butyl carbitol, or substances having the same vapor pressure characteristics as butyl carbitol, as the solvent (File Wrapper, II, pp. 778, 779, 873-877). While Gessler was prosecuting his application for patent, inks using butyl carbitol *acetate** (which, at 150° C. has a vapor pressure of only 40 mm. as compared with the vapor pressure of 60 mm. for butyl carbitol at the same temperature) as a solvent, were compounded to correct the deficiency of butyl carbitol, as is admitted (I, pp. 91, 121-123, 140-142; II, p. 767, col. 2, ll. 4-26; II, pp. 951, 952).

In view of the successful use of butyl carbitol *acetate* ink, Gessler saw that it was essential for him to obtain claims in his patent which would be broad enough to include an ink using a solvent which had a vapor pressure of about 40 mm. at 150° C., if his patent was to dominate the use of *both* butyl carbitol and its derivative, butyl carbitol acetate, as solvents for his ink. Because Gessler's specification disclosed *only* butyl carbitol as a solvent, Gessler necessarily was faced with difficulty in finding the requisite support in his specification for claims of the desired scope. He overcame that difficulty by inserting into his specification a self-serving statement comparing the volatility of butyl carbitol (the disclosed solvent) at 150° C. with that of ethyl alcohol at room temperature. Ethyl alcohol was not put forward by Gessler as a solvent for his ink. It was referred to only as an example of a "highly volatile liquid" at room temperature so as to

* Butyl carbitol acetate ink is specifically covered by a later Gessler patent, No. 2,128,672, not here in suit (II, p. 766).

afford a basis of comparison for the volatility of his selected solvents at 150° C. (II, p. 733a, col. 1, ll. 72-75). By strange coincidence, however, the vapor pressure of ethyl alcohol at room temperature, although only ⅔ the vapor pressure of the disclosed butyl carbitol, is precisely that of butyl carbitol acetate at 150° C., namely, 40 mm. (II, p. 767a, col. 1, ll. 64-75). This insertion was obviously new matter,* but with the specification so amended, Gessler was able to obtain claims which defined his ink as one including a solvent which has a vapor pressure of not more than .02 mm. at room temperature and a vapor pressure at 150° C. which "approximates that of ethyl alcohol at ordinary temperatures."

Such claims (passing for the moment the question of their validity under the *Muncie Gear* case, a question which petitioner does not propose to re-argue here) are clearly broad enough to encompass undisclosed butyl carbitol *acetate* inks. However, such claims *cannot* satisfy the statutory requirement that the patentee shall "particularly point out and distinctly claim" his invention, and at the same time be construed broadly enough to include petitioner's ink which uses a solvent, the vapor pressure of which at 150° C. is about the same as that of *water* at room temperature (*i. e.*, petitioner's solvent has a vapor pressure of 19-20 mm. at 150° C. and water has a vapor pressure of 17-18 mm. at room temperature; I, pp. 317-320; III, Ex. O-2, p. 763, Fig. 3).

Such solvents (petitioner's petroleum solvent) at "elevated temperature" (*e. g.*, 150° C.) *do not* become a "highly volatile liquid like such highly volatile liquids as, for example, ethyl alcohol", which Gessler (Patent, II, p. 733a, col. 1, ll. 72-75) teaches are comprehended by his patent. Quite the contrary. Such solvents, being comparable in volatility at 150° C. with water at room temperature (which is *not* a "highly volatile liquid"), are clearly without the disclosure of Gessler's patent.

---

* Insertion of new matter renders claims predicated thereon invalid (*Webster Co. v. Splitdorf Co.*, 264 U. S. 463, 465; *Dwight & Lloyd Sintering Co. v. Greenawalt* (C. C. A. 2, 1928), 27 F. (2d) 823, 828).

If, therefore, as the Court suggests in its Opinion, Gessler's claims may be construed as including petitioner's inks using solvents with a vapor pressure of 19-20 mm., at 150° C., and hence comparable to the vapor pressure of water at room temperature, such claims necessarily fail to "particularly point out and distinctly claim" Gessler's invention, as required by the Statute.

The Court's construction of these claims, moreover, renders the language used in both the claims and the specification meaningless to the art to which the patent is addressed. No man, skilled or unskilled in the art, would for a moment suggest that the vapor pressure of *water* "approximates" the vapor pressure of *ethyl alcohol* at room temperature. Indeed, Gessler himself negatives any such idea in that passage of his patent (II, p. 733a, col. 1, ll. 72-75) wherein he refers to ethyl alcohol as a "highly volatile liquid". While we do not deny that the word "approximates" in Gessler's claims permits of some "leeway" from the 40 mm. vapor pressure of ethyl alcohol at room temperature, we do assert that, if the claim is to serve its statutory purpose to particularly point out and distinctly claim the limits of Gessler's invention, the phrase "approximates that (vapor pressure) of ethyl alcohol" cannot be construed as including vapor pressures comparable to that of water. Even in a patent claim the word "approximates" must be given a meaning which approximates its dictionary definition, namely, "comes close to", and a vapor pressure of 19-20 mm. *does not "come close to"* 40 mm. Nor does the 20 mm. variation in vapor pressure between ethyl alcohol at room temperature (40 mm.) and butyl carbitol at 150° C. (60 mm.), serve to justify this construction. The fact that the Patent Office permitted Gessler to broaden his claims so as to reduce the lower limit of the vapor pressure of his solvent at 150° C. from 60 mm. to 40 mm. by his reference to ethyl alcohol, cannot now be used to permit him to disregard the plain language of his claims so as to broaden his

patent by *still further* reducing the lower limit for that critical vapor pressure of his solvent by an additional 20-21 mm.

Any such interpretation of Gessler's claims makes them meaningless and void. Either the claims of Gessler's patent mean what they say, that "approximates" the vapor pressure of ethyl alcohol at ordinary temperatures means "comes close to" that vapor pressure, or they are invalid for failure to comply with the Statute, U. S. C., Title 35, Sec. 33.

Gessler's claims, construed to cover respondent's ink fall directly afoul the rule of the Supreme Court in *United Carbon Co.* v. *Binney & Smith Co.* (317 U. S. 228, 234) where the Court said with respect to the claims there in suit:

> "Finally, what on first impression appears to be reasonable certainty of dimension disappears when we learn that 'approximately one-sixteenth of an inch in diameter' includes a variation from approximately 1/4th to 1/100th of an inch.
>
> So read, the claims are but inaccurate suggestions of the functions of the product, and fall afoul of the rule that a patentee may not broaden his claims by describing the product in terms of function."

In the *Binney & Smith* case, the Court also said (p. 236):

> "The statutory requirement of particularity and distinctness in claims is met only when they clearly distinguish what is claimed from what went before in the art and clearly circumscribe what is foreclosed from future enterprise. A zone of uncertainty which enterprise and experimentation may enter only at the risk of infringement claims would discourage invention only a little less than unequivocal foreclosure of the field."

In the instant case, the construction of the Gessler claims urged by respondent and adopted by the Court

clearly creates a zone of uncertainty with respect to the lower limit of vapor pressure at 150° C. of the solvent coming within the Gessler claims. So construed, the claims must be held invalid for failure to comply with the statute. Alternatively, if the claims are capable of a definite construction, they specify no more than a solvent having a vapor pressure at 150° C. that "comes close to" that of ethyl alcohol at ordinary temperatures, *viz.*, 40 mm. So construed, the vapor pressure of petitioner's solvent at 150°, *viz.*, 19-20 mm., is not "close to" 40 mm. since it is less than one-half of 40 mm., and less than one-third of the vapor pressure at 150° C. of the only usable solvent Gessler taught the art, butyl carbitol (60 mm.).

WHEREFORE, your petitioner prays that a rehearing in this appeal be granted and that the petitioner be allowed to reargue the appeal to the end that the material errors which exist both in fact and in law in the Opinion filed herein may be corrected, and justice may be done in the premises.

Respectfully submitted,

HOGUET, NEARY & CAMPBELL,
Attorneys for Petitioner.

WALTER H. FREE,
MARK N. DONOHUE,
Of Counsel.

We hereby certify that we have examined the foregoing petition for rehearing and, in our opinion, the petition is well founded in point of fact and law, and it is not interposed for the purpose of delay.

WALTER H. FREE
MARK N. DONOHUE

[fol. 1120] UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SECOND CIRCUIT

INTERCHEMICAL CORPORATION, Plaintiff-Appellant,

v.

SINCLAIR & CARROLL COMPANY, INC., Defendant-Appellee

Before Swan, Augustus N. Hand and Clark, Circuit Judges

Hoguet, Neary & Campbell, Walter H. Free, Mark N. Donohue, for the Petitioner.

Per CURIAM:

Petition for rehearing denied.

T. W. S., A. N. H., C. E. C., C. JJ.

Filed: September 22, 1944.

[fol. 1121] UNITED STATES CIRCUIT COURT OF APPEALS, SECOND CIRCUIT

At a Stated Term of the United States Circuit Court of Appeals, in and for the Second Circuit, held at the United States Courthouse in the City of New York, on the 22nd day of September one thousand nine hundred and forty-four.

Present: Hon. Thomas W. Swan, Hon. Augustus N. Hand, Hon. Charles E. Clark, Circuit Judges.

INTERCHEMICAL CORPORATION, Plaintiff-Appellant,

v.

SINCLAIR & CARROLL COMPANY, INC., Defendant-Appellee

A petition for a rehearing having been filed herein by counsel for the appellee,

Upon consideration thereof, it is

Ordered that said petition be and hereby is denied.

Alexander M. Bell, Clerk.

[fol. 1122] [Endorsed:] United States Circuit Court of Appeals, Second Circuit. Interchemical Corporation v. Sinclair & Carroll Company, Inc. Order. United States Circuit Court of Appeals, Second Circuit. Filed Sep. 22, 1944. Alexander M. Bell, Clerk.

these circumstances, the following language of Judge Learned Hand in the *Ruben* case in holding the patent there in suit invalid for want of invention seems to us to be controlling here (pp. 267, 268):

> "In the light of all this it seems to us that the patent does not rest upon an authentic invention, but upon one of those steps in an art which demand only patient experiment. Especially in chemistry it is possible to proceed by a system of trial and error, varying formulas by permutation and combination, and recording the results of each. Much that is valuable has been so discovered, and we will not say that the profitable survivals from such elimination can never be inventions; salvarsan for example, as its other name, '606', indicates, was hit upon by this method. Ordinarily invention demands more than that; some resumption of a line of experiment from which the art had looked away (E. I. Dupont De Nemours & Co. *v.* Glidden Co., 67 F. (2) 392, 397 (C. C. A. 2)), some departure which required originality or independence of conception; something more than routine testing of obvious combinations. Here we can find nothing more. * * * If the machine or composition appears shortly after some obstacle to its creation, technical or economic, has been removed, we should scrutinize its success jealously; if at about the same time others begin the same experiments in the same or nearby fields, or if these come to fruition soon after the patentee's, the same is true. Such a race does not indicate invention."

In these circumstances, petitioner respectfully submits that the Court was manifestly in error in failing to sustain the District Court's finding that the Gessler patent as to all claims in suit, is invalid for want of invention.

2. The Court, in adjudging Gessler's patent to be infringed, construed Gessler's claims so broadly as to render them invalid under the Statute (U. S. C., Title 35, Sec. 33) for indefiniteness.

Gessler's patent discloses but one ink; an ink utilizing butyl carbitol as a solvent from which the ink derives the physical properties claimed for it in the patent.

Originally, and up to September 28, 1935, Gessler's claims were properly limited to what he had disclosed, an ink utilizing butyl carbitol, or substances having the same vapor pressure characteristics as butyl carbitol, as the solvent (File Wrapper, II, pp. 778, 779, 873-877). While Gessler was prosecuting his application for patent, inks using butyl carbitol *acetate** (which, at 150° C. has a vapor pressure of only 40 mm. as compared with the vapor pressure of 60 mm. for butyl carbitol at the same temperature) as a solvent, were compounded to correct the deficiency of butyl carbitol, as is admitted (I, pp. 91, 121-123, 140-142; II, p. 767, col. 2, ll. 4-26; II, pp. 951, 952).

In view of the successful use of butyl carbitol *acetate* ink, Gessler saw that it was essential for him to obtain claims in his patent which would be broad enough to include an ink using a solvent which had a vapor pressure of about 40 mm. at 150° C., if his patent was to dominate the use of *both* butyl carbitol and its derivative, butyl carbitol acetate, as solvents for his ink. Because Gessler's specification disclosed *only* butyl carbitol as a solvent, Gessler necessarily was faced with difficulty in finding the requisite support in his specification for claims of the desired scope. He overcame that difficulty by inserting into his specification a self-serving statement comparing the volatility of butyl carbitol (the disclosed solvent) at 150° C. with that of ethyl alcohol at room temperature. Ethyl alcohol was not put forward by Gessler as a solvent for his ink. It was referred to only as an example of a "highly volatile liquid" at room temperature so as to

*Butyl carbitol acetate ink is specifically covered by a later Gessler patent, No. 2,128,672, not here in suit (II, p. 766).

afford a basis of comparison for the volatility of his selected solvents at 150° C. (II, p. 733a, col. 1, ll. 72-75). By strange coincidence, however, the vapor pressure of ethyl alcohol at room temperature, although only ⅔ the vapor pressure of the disclosed butyl carbitol, is precisely that of butyl carbitol acetate at 150° C., namely, 40 mm. (II, p. 767a, col. 1, ll. 64-75). This insertion was obviously new matter,* but with the specification so amended, Gessler was able to obtain claims which defined his ink as one including a solvent which has a vapor pressure of not more than .02 mm. at room temperature and a vapor pressure at 150° C. which "approximates that of ethyl alcohol at ordinary temperatures."

Such claims (passing for the moment the question of their validity under the *Muncie Gear* case, a question which petitioner does not propose to re-argue here) are clearly broad enough to encompass undisclosed butyl carbitol *acetate* inks. However, such claims *cannot* satisfy the statutory requirement that the patentee shall "particularly point out and distinctly claim" his invention, and at the same time be construed broadly enough to include petitioner's ink which uses a solvent, the vapor pressure of which at 150° C. is about the same as that of *water* at room temperature (*i. e.*, petitioner's solvent has a vapor pressure of 19-20 mm. at 150° C. and water has a vapor pressure of 17-18 mm. at room temperature; I, pp. 317-320; III, Ex. O-2, p. 763, Fig. 3).

Such solvents (petitioner's petroleum solvent) at "elevated temperature" (*e. g.*, 150° C.) *do not* become a "highly volatile liquid like such highly volatile liquids as, for example, ethyl alcohol", which Gessler (Patent, II, p. 733a, col. 1, ll. 72-75) teaches are comprehended by his patent. Quite the contrary. Such solvents, being comparable in volatility at 150° C. with water at room temperature (which is *not* a "highly volatile liquid"), are clearly without the disclosure of Gessler's patent.

---

* Insertion of new matter renders claims predicated thereon invalid (*Webster Co. v. Splitdorf Co.*, 264 U. S. 463, 465; *Dwight & Lloyd Sintering Co. v. Greenawalt* (C. C. A. 2, 1928), 27 F. (2d) 823, 828).

If, therefore, as the Court suggests in its Opinion, Gessler's claims may be construed as including petitioner's inks using solvents with a vapor pressure of 19-20 mm., at 150° C., and hence comparable to the vapor pressure of water at room temperature, such claims necessarily fail to "particularly point out and distinctly claim" Gessler's invention, as required by the Statute.

The Court's construction of these claims, moreover, renders the language used in both the claims and the specification meaningless to the art to which the patent is addressed. No man, skilled or unskilled in the art, would for a moment suggest that the vapor pressure of *water* "approximates" the vapor pressure of *ethyl alcohol* at room temperature. Indeed, Gessler himself negatives any such idea in that passage of his patent (II, p. 733a, col. 1, ll. 72-75) wherein he refers to ethyl alcohol as a "highly volatile liquid". While we do not deny that the word "approximates" in Gessler's claims permits of some "leeway" from the 40 mm. vapor pressure of ethyl alcohol at room temperature, we do assert that, if the claim is to serve its statutory purpose to particularly point out and distinctly claim the limits of Gessler's invention, the phrase "approximates that (vapor pressure) of ethyl alcohol" cannot be construed as including vapor pressures comparable to that of water. Even in a patent claim the word "approximates" must be given a meaning which approximates its dictionary definition, namely, "comes close to", and a vapor pressure of 19-20 mm. *does not* "*come close to*" 40 mm. Nor does the 20 mm. variation in vapor pressure between ethyl alcohol at room temperature (40 mm.) and butyl carbitol at 150° C. (60 mm.), serve to justify this construction. The fact that the Patent Office permitted Gessler to broaden his claims so as to reduce the lower limit of the vapor pressure of his solvent at 150° C. from 60 mm. to 40 mm. by his reference to ethyl alcohol, cannot now be used to permit him to disregard the plain language of his claims so as to broaden his

patent by *still further* reducing the lower limit for that critical vapor pressure of his solvent by an additional 20-21 mm.

Any such interpretation of Gessler's claims makes them meaningless and void. Either the claims of Gessler's patent mean what they say, that "approximates" the vapor pressure of ethyl alcohol at ordinary temperatures means "comes close to" that vapor pressure, or they are invalid for failure to comply with the Statute, U. S. C., Title 35, Sec. 33.

Gessler's claims, construed to cover respondent's ink fall directly afoul the rule of the Supreme Court in *United Carbon Co.* v. *Binney & Smith Co.* (317 U. S. 228, 234) where the Court said with respect to the claims there in suit:

> "Finally, what on first impression appears to be reasonable certainty of dimension disappears when we learn that 'approximately one-sixteenth of an inch in diameter' includes a variation from approximately 1/4th to 1/100th of an inch.
>
> So read, the claims are but inaccurate suggestions of the functions of the product, and fall afoul of the rule that a patentee may not broaden his claims by describing the product in terms of function."

In the *Binney & Smith* case, the Court also said (p. 236):

> "The statutory requirement of particularity and distinctness in claims is met only when they clearly distinguish what is claimed from what went before in the art and clearly circumscribe what is foreclosed from future enterprise. A zone of uncertainty which enterprise and experimentation may enter only at the risk of infringement claims would discourage invention only a little less than unequivocal foreclosure of the field."

In the instant case, the construction of the Gessler claims urged by respondent and adopted by the Court

clearly creates a zone of uncertainty with respect to the lower limit of vapor pressure at 150° C. of the solvent coming within the Gessler claims. So construed, the claims must be held invalid for failure to comply with the statute. Alternatively, if the claims are capable of a definite construction, they specify no more than a solvent having a vapor pressure at 150° C. that "comes close to" that of ethyl alcohol at ordinary temperatures, *viz.*, 40 mm. So construed, the vapor pressure of petitioner's solvent at 150°, *viz.*, 19-20 mm., is not "close to" 40 mm. since it is less than one-half of 40 mm., and less than one-third of the vapor pressure at 150° C. of the only usable solvent Gessler taught the art, butyl carbitol (60 mm.).

WHEREFORE, your petitioner prays that a rehearing in this appeal be granted and that the petitioner be allowed to reargue the appeal to the end that the material errors which exist both in fact and in law in the Opinion filed herein may be corrected, and justice may be done in the premises.

Respectfully submitted,

HOGUET, NEARY & CAMPBELL,
Attorneys for Petitioner.

WALTER H. FREE,
MARK N. DONOHUE,
Of Counsel.

We hereby certify that we have examined the foregoing petition for rehearing and, in our opinion, the petition is well founded in point of fact and law, and it is not interposed for the purpose of delay.

WALTER H. FREE
MARK N. DONOHUE

[fol. 1120] UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SECOND CIRCUIT

INTERCHEMICAL CORPORATION, Plaintiff-Appellant,

v.

SINCLAIR & CARROLL COMPANY, INC., Defendant-Appellee

Before Swan, Augustus N. Hand and Clark, Circuit Judges

Hoguet, Neary & Campbell, Walter H. Free, Mark N. Donohue, for the Petitioner.

Per CURIAM:

Petition for rehearing denied.

T. W. S., A. N. H., C. E. C., C. JJ.

Filed: September 22, 1944.

[fol. 1121] UNITED STATES CIRCUIT COURT OF APPEALS, SECOND CIRCUIT

At a Stated Term of the United States Circuit Court of Appeals, in and for the Second Circuit, held at the United States Courthouse in the City of New York, on the 22nd day of September one thousand nine hundred and forty-four.

Present: Hon. Thomas W. Swan, Hon. Augustus N. Hand, Hon. Charles E. Clark, Circuit Judges.

INTERCHEMICAL CORPORATION, Plaintiff-Appellant,

v.

SINCLAIR & CARROLL COMPANY, INC., Defendant-Appellee

A petition for a rehearing having been filed herein by counsel for the appellee,

Upon consideration thereof, it is

Ordered that said petition be and hereby is denied.

Alexander M. Bell, Clerk.

[fol. 1122] [Endorsed:] United States Circuit Court of Appeals, Second Circuit. Interchemical Corporation v. Sinclair & Carroll Company, Inc. Order. United States Circuit Court of Appeals, Second Circuit. Filed Sep. 22, 1944. Alexander M. Bell, Clerk.

[fol. 1123] UNITED STATES CIRCUIT COURT OF APPEALS, SECOND CIRCUIT

At a Stated Term of the United States Circuit Court of Appeals, in and for the Second Circuit, held at the United States Courthouse in the City of New York, on the 17th day of October one thousand nine hundred and forty-four.

Present: Hon. Thomas W. Swan, Hon. Augustus N. Hand, Hon. Charles E. Clark, Circuit Judges.

INTERCHEMICAL CORPORATION, Plaintiff-Appellant,

v.

SINCLAIR & CARROLL COMPANY, INC., Defendant-Appellee

Appeal from the District Court of the United States for the Southern District of New York

This cause came on to be heard on the transcript of record from the District Court of the United States for the Southern District of New York, and was argued by counsel.

On consideration whereof, it is now hereby ordered, adjudged, and decreed that the judgment of said District Court be and it hereby is reversed with costs.

It is further ordered that a Mandate issue to the said District Court in accordance with this decree.

Alexander M. Bell, Clerk.

[fol. 1124] [Endorsed:] United States Circuit Court of Appeals, Second Circuit. Interchemical Corporation v. Sinclair & Carroll Company, Inc. Order for Mandate. United States Circuit Court of Appeals, Second Circuit. Filed Oct. 17, 1944. Alexander M. Bell, Clerk.

[fol. 1125] Clerk's Certificate to foregoing transcript omitted in printing.

[fol. 1126] SUPREME COURT OF THE UNITED STATES

ORDER ALLOWING CERTIORARI—Filed December 11, 1944

The petition herein for a writ of certiorari to the United States Circuit Court of Appeals for the Second Circuit is granted.

And it is further ordered that the duly certified copy of the transcript of the proceedings below which accompanied the petition shall be treated as though filed in response to such writ.

FILE COPY

Office
NOV 6
CHARLES ELMORE

IN THE

Supreme Court of the United States

October Term, 1944

No. 656

SINCLAIR & CARROLL COMPANY, Inc.,
Petitioner,

v.

INTERCHEMICAL CORPORATION,
Respondent.

PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SECOND CIRCUIT, AND SUPPORTING BRIEF

William D. Mitchell,
Attorney for Petitioner.

Walter H. Free,
Mark N. Donohue,
Of Counsel.

INDEX

PAGE

PETITION:

Statement 1

The Patent 2

The Alleged Infringing Ink 4

Questions Presented 4

Facts 6

Prior Patents and Publications 9

Infringement 12

Specification of Errors 15

Reasons for Granting the Writ 16

Prayer 17

BRIEF:

Opinions Below 18

Jurisdiction 18

Statement 18

Summary of Argument 18

PAGE

Argument:

I. The decision of the Circuit Court of Appeals below upholds the monopoly of a patent to respondent for an improvement which, at best, requires only a low order of skill in the art to produce 19

II. The decision of the Circuit Court of Appeals sustained as valid patent claims which, when construed to cover petitioner's ink, fail completely to particularly point out and distinctly claim the patentee's invention as required by the express provisions of R. S. 4888 and the applicable decisions of this Court 23

III. The Court of Appeals, in reversing the findings of fact of the District Court, failed to conform to Rule 52(a) of the Federal Rules of Civil Procedure 25

Conclusion 26

AUTHORITIES CITED

	PAGE
Adamson v. Gilliland, 242 U. S. 350, 353	25
Alexander Milburn Co. v. Davis-Bournonville Co., 270 U. S. 390, 401	11
Altoona Publix Theatres, Inc. v. American Tri-Ergon Corp., 294 U. S. 477, 488	19, 20, 21
Atlantic Works v. Brady, 107 U. S. 192, 200	19
Cuno Engineering Corp. v. Automatic Devices Corp., 314 U. S. 84, 91	19, 22
Davis v. Schwartz, 155 U. S. 631, 636	25
Exhibit Supply Co. v. Ace Patents Corp., 315 U. S. 126, 136	25
General Electric Co. v. Wabash Appliance Corp., 304 U. S. 364, 369	25
Goodyear Tire & Rubber Co. v. Ray-O-Vac Co., 321 U. S. 275	23
Hotchkiss v. Greenwood, 11 How. 264, 267	19
United Carbon Co. v. Binney & Smith Co., 317 U. S. 228, 234	25

IN THE

Supreme Court of the United States

October Term, 1944

No. .....

SINCLAIR & CARROLL COMPANY, INC.,
Petitioner,

v.

INTERCHEMICAL CORPORATION,
Respondent.

PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SECOND CIRCUIT, AND SUPPORTING BRIEF

To the Honorable the Chief Justice and Associate Justices of the Supreme Court of the United States:

The petitioner prays that a writ of certiorari issue to review the judgment of the United States Circuit Court of Appeals for the Second Circuit, entered in this cause on August 28, 1944 (II,* p. 1094); petition for rehearing denied September 22, 1944 (II, p. 1120).

STATEMENT

This is an action for infringement of a patent covering a composition of matter, viz., a printer's ink. The respondent was plaintiff in the District Court.

* Roman numerals in parentheses indicate record volume.

The District Court found that the patent was invalid for want of invention and anticipation, and that the petitioner's ink did not infringe because not within the scope of the patent claims (II, pp. 1024-1051).

The Circuit Court of Appeals reversed the findings of the District Court, holding that there was invention, that the patent was valid, and that petitioner had infringed (II, p. 1094).

The Patent

The patent, No. 2,087,190 (II, p. 733) was issued to Albert E. Gessler, July 13, 1937, on an application filed July 14, 1932, forfeited April 10, 1936, renewed April 11, 1936, and assigned to respondent's predecessor. Claims 3, 10, 11, 12 and 13 are in suit. Claim 3, which is typical, and here used as the basis for discussion, is as follows:

> "3. A printing ink which is substantially non-drying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component completely dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink—the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, substantially all of the liquid component having a vapor pressure at 20° C. as low as that of diethylene glycol monobutyl ether at 20° C., and the major part of the liquid component having a vapor pressure which at 150° C. approximates that of ethyl alcohol at ordinary temperatures * and forming a stable solution with the solid component."

The patent is not for a process or method of using ink, but merely for a compound—an ink consisting of a pig-

* An indirect way of stating a vapor pressure of 40 mm., since the vapor pressure of ethyl alcohol at "ordinary temperatures" is given as 40 mm. in the patent (II, p. 733a, col. 1, l. 75—col. 2, l. 2).

ment, dispersed in a vehicle composed of a binder (solid component) dissolved in a solvent for the binder (II, p. 733b, cl. 3). The drying characteristics inherent in the solvent are imparted to and control the drying characteristics of the ink (II, p. 733a, ll. 4-9). The claimed ink, by reason of the solvent that is specified, has the attributes of being non-drying on the type or printing rolls at ordinary temperatures, and of drying almost instantly on application of heat to the printed paper. To obtain those desirable drying characteristics in the ink, the claims specify that the solvent (liquid component) in the ink shall have a vapor pressure* at 20° C. (about 70° F. or ordinary room temperature) of no higher than .02 mm. (that of diethylene glycol monobutyl ether, the trade name for which is butyl carbitol), and upon application of heat its vapor pressure shall rise so that at 150° C. its vapor pressure "approximates" 40 mm. (that being the vapor pressure at ordinary temperatures of ethyl alcohol). At that vapor pressure (40 mm.) the solvent evaporates rapidly, leaving the binder and pigment on the paper as the printed matter.

An ink so compounded may be used on modern, fast presses, through which the paper passes in a continuous strip, and especially where glossy, non-absorbent paper is used, as in magazines, provided such presses are equipped with a heater over which the paper passes after printing.

The patentee does not claim that he invented the idea of adding a heater to the press, nor does he claim that he discovered a solvent with the required evaporation characteristics. The only claim is that he was the first to compound an ink with such a solvent, and that his success resulted from invention and not from ordinary skill in the art.

---

* The pressure exerted against the atmosphere by any liquid in its effort to evaporate. The higher the vapor pressure the faster the evaporation. Vapor pressure and consequently evaporation rate may be increased by heat. The unit of measure is the number of millimeters of height of a column of mercury necessary to balance the vapor pressure at a given temperature, so that vapor pressure is expressed in mm. of mercury.

The Alleged Infringing Ink

Petitioner's ink contains a solvent* which has a vapor pressure at 20° C. as low as .02 mm., that specified in the claims, but at 150° C. its vapor pressure is only 20 mm., which is substantially the same as that of *water* at ordinary temperature, and only *half* that specified in the claims (I, pp. 56, 281, 295, 306, 317, 318). Thus, petitioner's ink solvent at 150° C. does not become a "highly volatile liquid like such highly volatile liquids as, for example, ethyl alcohol . . . at ordinary room temperature" (20° C.) as specified in the patent (II, p. 733a, col. 1, l. 73—col. 2, l. 2); on the contrary, at that temperature (150° C.), petitioner's ink solvent is no more volatile and has no higher rate of evaporation than water at ordinary room temperature (20° C.). It cannot be used successfully in presses equipped with the steam drum type of drying apparatus of the type with which Gessler was familiar when his application was filed, where the degree of heat developed is limited to about 150° C., because petitioner's ink does not dry rapidly enough. It can be used successfully only in presses equipped with the new oven or flame type heaters, introduced in 1937, which develop temperatures of 1700° F. (over 900° C.) (I, pp. 550-1).

QUESTIONS PRESENTED

Three principal questions are presented:

1. Did it require invention, within the meaning of the Patent Statute, R. S. 4886 and the applicable decisions of this Court, to compound the ink of Gessler's patent?

The patentee claims to be the first to have compounded a printer's ink which, because of the solvent used, has such low volatility at ordinary temperatures that it remains wet indefinitely on type or printing rolls, but be-

*A petroleum (paraffin hydrocarbon) derivative from the kerosene series, and known as "502 C oil" (I, pp. 56, 57, 383, 408).

comes so volatile on application of heat after printing that it dries instantly. He does not claim that the use of heating devices on presses was his invention, nor does he claim to have discovered or produced a solvent of the required drying characteristics. He merely asserts that he was the first to compound an ink with such a solvent. The petitioner contends that no invention was required to compound such an ink; that prior patents disclosed inks compounded with solvents having the specified vapor pressure characteristics, that such solvents were readily available, and that in the light of the disclosures of the prior art, the production of Gessler's ink required at most only ordinary skill in the art.

2. If the patent is valid, may the claims thereof, which specify inks containing a solvent having a vapor pressure which at 150° C. "approximates that of ethyl alcohol at ordinary temperatures" (viz., 40 mm.), be construed to include such inks as petitioner's, which use a solvent having a vapor pressure at 150° C. of only 20 mm., which is substantially the vapor pressure of water at ordinary temperatures?

The precise question is whether, in Gessler's claims, a vapor pressure of 20 mm. "approximates" one of 40 mm. The Court of Appeals stretched the word "approximates" to that extent. Petitioner claims that the record shows that in selecting 40 mm. as about the vapor pressure to be reached at 150°, the patentee meant to go as low as he could so as to include all solvents which would work with the highest degree of heat he thought practicable to apply to the printed paper, viz., 150° C. and to *exclude* those solvents which at *that temperature* were not highly volatile liquids, comparable in volatility (at that temperature) to ethyl alcohol at room temperature; that he never conceived of the use of the type of heater (developing temperatures as high as 900° C.), which is necessary to dry petitioner's ink rapidly; and that the word "approximates" as here used does not permit a tolerance so wide as 20 mm., so as

to include solvents comparable in volatility at 150° C. to water at ordinary temperature. Conversely, petitioner contends that if Gessler's claims can be stretched to include inks using a solvent with a vapor pressure of 20 mm. at 150° C., such claims are defective under Sec. 4888 R. S., and the applicable decisions of this Court, because they do not define Gessler's invention with the definiteness and particularity required, and do not warn the public that such an ink would infringe.

3. Did the Circuit Court of Appeals, in reversing the findings of the District Court, fail to conform to Rule 52(a), Federal Rules of Civil Procedure which states that "Findings of fact shall not be set aside unless clearly erroneous"? This question is directly related to the two preceding questions.

FACTS

Modern high speed printing presses into which is fed a continuous "web" or strip of paper, which is printed by contact with rapidly revolving rollers, are and have been for many years in common use. Ink used in such presses must be of a kind which stays moist indefinitely at room temperatures and does not dry on the printing rollers and type. When printed on absorbent paper, such as newsprint, it is not necessary that the ink dry quickly after printing. The paper absorbs the ink, and after the paper is printed on one side, it may pass immediately over other rollers and be printed on the other side, and then pass immediately to cutting and folding devices, all without smearing or smudging. Printing on non-absorbent, or glossy paper, generally used in magazines, presents a different problem. When printed on one side of the paper, the ink is not absorbed, and if it remains wet, it is easily smudged or rubbed off. Printing on the other side must be delayed until the ink is dried. An ink which

dries quickly at room temperatures cannot be used, as it dries equally quickly on the rollers and type. Prior to 1932 printing of magazines on glossy or non-absorbent papers was not done on the high speed presses such as are used for newspapers, but usually sheets, not continuous strips, were pressed on flat plates, and after printing one side, were laid aside for a time until dry and then printed on the other side, and after that the cutting and folding were further delayed (I, pp. 587, 588, 592).

Solvents for use in inks, and which would stay wet on the rollers and type but would dry instantly on application of heat, had long been available, and inks containing such solvents had been known and made (I, pp. 251, 266, 281-288, 321, 322, 690; II, pp. 957, 961, 985-7), but no one seems to have provided the fast presses with heating devices to instantly dry the ink after printing so as to permit use of such presses on non-absorbent paper (I, pp. 73, 74, 154, 513, 515, 551, 588, 590, 605, 606).

In 1930 Gessler, a chemist, was employed by Zinsser & Co., makers of chemicals, pigments and dyes (I, p. 109). Frank W. Cray was in the printing ink business with Cray-Finne Corporation, with which Gessler's company did business. In June, 1930, Cray asked Gessler to prepare an *odorless* printing ink, and Gessler prepared some samples (I, pp. 72, 109, 702). In this work, Gessler wanted an odorless solvent which would stay wet at ordinary temperatures. To find it, he examined the catalogues of Carbide & Carbon Chemicals Corporation, a manufacturer of chemical products, and found advertised there three solvents suitable for ink, which he tried out. He discarded two and finally selected butyl carbitol (I, pp. 719-722). Gessler observed from the catalogue (II, pp. 985-8) that butyl carbitol had a mild odor, and that it had a vapor pressure of only .05 mm. at 20° C., and a boiling point of 222° C., and therefore would not dry at room temperature. He selected it as a solvent for an odorless ink which would stay wet on the rollers and type and not

harden on the press. This odorless ink was unsatisfactory because it stayed wet too long on the paper (I, pp. 72-3). At that time (1930) Gessler was not interested in whether the ink would dry on application of heat, and no suggestion for putting a heating device in the press was made. However, early in 1932 Cray thought of heat for drying the ink and again went to Gessler, as he testified (I, p. 73):

> "So I got hold of Dr. Gessler, and I discussed that point with him. I said, 'Could you make me an ink that would be dry after being printed? *We can put it over some kind of a heating device.*' He said, 'Yes, I think we could.' He said, 'In fact, one of those inks I made for you in the beginning would do that.'" (Italics ours.)

It was as easy as that. The old samples of odorless ink made in 1930 were found to have dried up, so in February, 1932 Gessler made up new samples, and as Cray said, "I was able to make a print of that and pass that print over a hot plate and dry the ink. From there on we went to work" (I, p. 74).

Of this incident Gessler said:

> "Q. Did Mr. Cray ask you to furnish him an ink which could be used on a press provided with a heater? A. Yes, he did" (I, p. 706).

Again:

> "And now, when Mr. Cray came, in the year 1932, and told me that heating units, steam-heated rollers are used on printing presses, that was the last key that I needed for the solution of the problem. I had not known that before, and I knew that if I could apply any heat to the thin film of those inks that they would dry almost instantaneously" (I, pp. 708-9).*

* Cray had not said that heated rollers were in use, but that they could be supplied.

The record shows that it was Cray, not Gessler, who thought of using heating devices on the press, and that solvents for ink, with the required characteristics were well known, made by others, not Gessler.

The patent, of course, is for a printing ink, and not for a method or process, or for the use of a heater. The claims cover every ink containing a solvent, which has the specified vapor pressures at ordinary temperature (20° C.) and at elevated temperature (150° C.), *regardless of why it is put in the ink.*

No invention was required to compound such an ink. With solvents having the requisite vapor pressure characteristics available, and with the teachings of the prior art patents before him, any experienced ink compounder could have produced Gessler's ink as soon as the demand arose, by exercising only ordinary skill of a very low order.

Prior Patents and Publications

Patent No. 1,439,696, issued to Doughty in 1922 (II, p. 961), covered a composition of ink. The inventor had in mind particularly an ink with metallic pigments suitable for stamping titles and designs on bookbinding, but also "for other purposes to which the ink may be adapted" (II, p. 961, ll. 12-17). He stated:

> "A difficulty which has prevented the use of metallic pigment inks is due to vehicles which dry too rapidly on the inking rolls, covering them generally with a gummy coating which prevents transfer of the ink to the type or die. In avoiding this extreme it is necessary to provide an ink which when once applied will dry rapidly.
>
> "It is the object of the invention to provide an ink and an ink vehicle having the necessary properties, among others comparative slowness in drying without a tendency to become gummy, a consistency permitting transference of the ink through inking rolls to the

type or die, rapid drying when applied to the work, and ability to protect the pigment from oxidation and consequent discoloration.

"I have discovered that these desirable properties may be imparted to the ink by the use of a suitable medium in the vehicle for the pigment and that such a medium will, moreover, permit rapid drying of the ink by the application of heat to the type or die" (II, p. 961, ll. 38-61).

Doughty stated that the medium (solvent) should be "capable of being vaporized . . . but its boiling point should be relatively high to reduce vaporization at atmospheric temperatures, and consequently to prevent rapid drying on the inking rolls" and that "Solvents boiling materially below 200° C. are unsuitable because the ink dries too rapidly on the rolls" (II, p. 961, ll. 62-75).

Among suitable solvents Doughty named terpinyl acetate (II, p. 961, l. 90). It has the same vapor pressure as butyl carbitol, viz., about .02 mm. at ordinary temperatures, and about 60 mm. at 150° C., and has a boiling point of about 222° C. (I, pp. 306-8; II, p. 1101; III, Exs. D-1, E-1).

Doughty's idea of a heating device to dry the ink after printing was to heat the type or die itself and apply heat that way. He stated:

"The ink dries very slowly at atmospheric temperature owing to the high boiling point of the volatile solvent. It dries rapidly, however, when applied with a heated die" (II, p. 962, ll. 58-61).

His specifications teach unmistakably that a composition of ink which is not volatile at room temperatures, and hence non-drying on the inking rolls or type, but which will dry quickly by application of heat after printing, may be made by the use of a solvent, non-volatile at room temperature, but with a boiling point between 200° C. and 300° C. If Doughty's patent had been later than Gessler's, the inks disclosed therein would clearly infringe Gessler's claims.

The patent to Lefferts and Stevens, No. 380,654, issued in 1888 (II, p. 957), covers a composition of ink. Lefferts' specifications teach the use of heat after printing for drying, and solvents which keep the ink from drying before printing (II, p. 958, ll. 62-68, 75-80, 109-114). True the primary purpose was to produce an ink with a solvent which would dissolve celluloid surfaces on which printing is done, and cause the ink to penetrate the printed surface, just as butyl carbitol is a celluloid solvent (II, p. 987). The patent recommends oil of cassia as a solvent for an ink and claims 3 and 5 cover that ink (II, p. 958, ll. 33-44, 103; p. 959, ll. 6, 108, 118). The oil of cassia available today has a vapor pressure as low as .02 mm. at 20° C. and of 40 mm. at 150°. Hence Lefferts' oil of cassia ink comes squarely within the terms of Gessler's claims and if made today would infringe Gessler's patent (I, pp. 280-2, 307-8, 321-2; III, Ex. P, E-1). The Court of Appeals brushed this patent aside because there was no proof that the oil of cassia of 1888 had the same characteristics.

The patent to Jirousek, No. 1,954,627, applied for April 18, 1932 (II, p. 983) was rejected by the Court of Appeals as not being a proper reference against Gessler, because although Jirousek described heat drying ink, the ink also contains some linseed oil, which Gessler excludes. But Jirousek's specifications are pertinent as bearing on the question whether Gessler did more than exercise ordinary skill.* Jirousek's patent discloses ink containing solvent mixtures which remain wet at normal temperatures, which have high boiling points, and which dry quickly on application of heat (II, p. 983, ll. 71-78, 97-103; p. 984, ll. 8-15; I, pp. 313-5, 415-6, 419, 427-9, 468).

The article by M. E. Hansen, published in Printing Equipment Engineer in December, 1931 (II, p. 990), was discarded by the Court of Appeals as merely stating the problem without giving a solution. In Hanson's statement of the characteristics desired for a plastic ink "for

* *Alexander Milburn Co. v. Davis-Bournonville Co.*, 270 U. S. 390, 401.

rapid drying", he included the requirements that the ink would not dry on the rolls at room temperature, but would "dry in a small fraction of a second" on application of heat to the printed sheet. He did more than merely state the problem. He pointed out that the solution of the problem is found in the use of solvents having evaporation characteristics such that, at room temperature, the ink does not dry, but dries instantly on application of the highest heat that can be practically applied. Hanson's article is really a suggestion that chemical manufacturers conduct further research to produce the desired solvents. He evidently had not examined the 1929 and 1930 catalogues of Carbide and Carbon Chemicals Corporation (II, pp. 985-988) which revealed the very solvents required.

With Hanson's article and some of the prior patents before him, the Carbide and Carbon Chemicals Corporation's catalogue in his hand, and in his mind Cray's great news that a heating device could be attached to a fast press, Gessler did not need to exercise more than a very low order of skill in the art to prepare the desired composition of ink.

Infringement

The principal issue bearing on the question of infringement is whether on a fair interpretation of the word "approximates" in the patent claims, a solvent having a vapor pressure of only 20 mm. at 150° C. (the vapor pressure of water at ordinary temperatures) has a pressure which "approximates" 40 mm. (the vapor pressure of ethyl alcohol at ordinary temperatures).

The theory of the Court of Appeals for holding that 20 mm. "approximates" 40 mm., is that since Gessler clearly intended to cover inks containing butyl carbitol, which has a vapor pressure at 150° of 60 mm., and since a vapor pressure of 60 mm. is 20 mm. *above* 40 mm., a

solvent with a vapor pressure of 20 mm. *below* 40° was intended to be included (II, p. 1105). This specious reasoning not only disregards the express provisions of the statute, R. S. 4888, and the explicit rulings of this Court, requiring definiteness in patent claiming, but it is refuted by the record. The file wrapper and Gessler's patent (II, pp. 769-944) discloses that he never intended to include in his invention inks using solvents having a vapor pressure at 150° C. of 20 mm. and therefore being at that temperature no more volatile than water at ordinary temperatures. He was interested only in solvents which, at 150° C. become "highly volatile" liquids, such as is ethyl alcohol at ordinary temperatures (II, p. 733a, col. 1, l. 73–col. 2, l. 2, and pp. 886, 890-1). In his early claims, Gessler had described his solvents in terms of function, not in terms of specific physical attributes (II, p. 778). He was pressed by the Patent Office to adopt a different type of description and thus it came about that his claims describe his solvents in terms of vapor pressure at various temperatures (II, pp. 781, 799).

Gessler had in mind butyl carbitol which, at 150° C., has a vapor pressure of 60 mm. (II, p. 733a, col. 1, l. 71). It is the only solvent mentioned in his specifications or claims. It was the only solvent he had then located which was suitable (I, pp. 707, 720). Inasmuch as he wanted to cover every other solvent which might later be used or discovered, he naturally made his vapor pressure at 150° as low as he could when pressed by the Patent Office to be specific, and so he selected for the vapor pressure to be "approximated" as low a one as would work with the degree of heat he then thought practicable to apply. That vapor pressure at 150° C. was 40 mm., well below that (60 mm.) of butyl carbitol at 150° C. He chose that low vapor pressure because he then was thinking in terms of the use of a steam-heated drum or roller on the press, which he knew could not be heated beyond 150° C. without damaging the paper (II, pp. 890-1).

As petitioner's ink has a vapor pressure of only 20 mm. at 150° C., it is necessary, in order to dry it instantly, to use devices (other than steam-heated drums or rollers), which develop temperatures of around 1700° F. (over 900° C.), and thus make available, for drying purposes, temperatures much higher than the 150° C. which is available with a steam-heated drum or roller (I, pp. 550-1). The highest temperature Gessler mentioned in his patent is 150° C. He there speaks of solvents "highly volatile" at 150° C. (II, p. 733a, col. 1, ll. 5, 6, 72-5, col. 2, l. 16). The record shows he was always thinking of *steam-heated* rollers in the press. Thus, Gessler said (I, pp. 708-9) that in 1932 he learned from Cray that steam-heated rollers could be used. In his written disclosure of April 4, 1932, he speaks again of steam-heated rollers (II, p. 763, l. 19). He used steam-heated rollers in his experiments in 1932 (I, p. 722).

Cray was using steam drums in May, 1932, heated to 237° F. (114° C.). (I, pp. 74, 77).

Cray and Gessler used steam drums at Curtis Publishing Company in November, 1932 (I, p. 79).

Steam drums can be heated to 245° F. (118° C.) without damaging paper if the paper travels fast enough (I, pp. 205-6).

In the file wrapper, Gessler's attorney stated (II, p. 790):

> "The temperature of the printed material when it passes, for instance, over a heated roller, lies between 100° C. and 150° C., and it is evident that practically instantaneous evaporation of the ink (solvent) takes place. . . ."

Again (II, p. 840) in the file wrapper, in discussing McElroy's patent, Gessler's attorney stated that a temperature of 500° F. (260° C.) "is much higher than that which could be used in the successful operation of applicant's process". At page 890 in the file wrapper Gessler's attorney stated:

> "To accomplish the results obtained by applicant's ink, no solvent can be equivalent to this solvent, if it has a vapor pressure substantially higher than 0.06 mm. at 20° C., for in this case the ink would dry on the press, or if it has a comparatively low vapor pressure at 150° C., as in this case, it could not be vaporized instantly by any heat which can safely be applied to printing matter."

It was the new "flame type" of heater which made inks containing solvents with vapor pressures as low as 20 mm. at 150° C. usable for the first time in fast presses. They develop from 1500° F. to 1900° F. (815° to 1040° C.) in the heater (I, pp. 556-1, 606, 68, 92). The first practical oven or flame heater was introduced in 1937 (I, p. 551), before petitioner's ink was placed on the market. Hot as these "flame type" heaters are, they have been developed so that they can be used without damage to paper running at high speeds (I, pp. 68, 70, 94).

The record plainly shows that, if Gessler's claims have captured solvents as non-volatile at 150° C. as water is at ordinary temperatures (20° C.), Gessler has found himself unexpectedly the possessor of a monopoly with a scope far beyond his conception at the time his patent issued.

Specification of Errors

The Circuit Court of Appeals erred:

1. In holding that Gessler made an invention and that his inks resulted from anything more than the application of ordinary skill in the art.

2. In holding that the petitioner had infringed and in construing the statement in the claims that the solvent must have a vapor pressure at 150° C. which "approximates" .40 mm., to include one having a vapor pressure

of only 20 mm. at 150°. It overlooked the point that with such a broad application of the claims they fail to comply with Sec. 4888 R. S. requiring that the invention be clearly and exactly defined.

3. In setting aside the findings of the trial court, despite Rule 52(a), Federal Rules of Civil Procedure, which states that such findings shall not be set aside unless "clearly erroneous".

Reasons for Granting the Writ

This case has a definite public interest. The use of the solvents developed by Carbide and Carbon Chemicals Corporation and other manufacturers, in inks, together with the use of heating devices on printing presses, has resulted in enabling the publishers of magazines like Collier's, Saturday Evening Post, Life, New Yorker, and innumerable others, to speed up their printing, with the result that the sustaining of Gessler's patent enables his assignee to exact a monopolistic tribute from ink manufacturers, and therefore magazine publishers and readers, when Gessler himself never thought of the use of a heating device and never developed or invented any solvent, and really invented nothing. In these circumstances, the discretionary power of this Court is invoked upon the following grounds, which fall within one or more of the classes described in paragraph 5 of Rule 38 of the Rules of this Court.

1. In upholding the monopoly of a patent to Gessler for an ink compound consisting of coloring matter dispersed in a vehicle composed of a binder dissolved in a solvent having specified evaporation characteristics, the Court below has decided a question of Federal law in conflict with a long line of applicable decisions of this Court, which established firmly the rule that the monopoly of a

patent cannot be obtained for an improvement which requires only ordinary skill in the art.

II. In upholding the Gessler patent and construing the Gessler claims so broadly as to be infringed by petitioner's ink, the Court below has sustained as valid patent claims which fail to comply with the requirements of R. S. 4888 and the applicable decisions of this Court in that they do not particularly point out and distinctly claim the patentee's invention.

III. In reversing the findings of fact of the District Court, the Circuit Court of Appeals failed to conform to Rule 52(a) of the Federal Rules of Civil Procedure providing that findings of fact shall not be set aside unless clearly erroneous.

Prayer

WHEREFORE, your petitioner respectfully prays that a Writ of Certiorari be issued to the Circuit Court of Appeals for the Second Circuit to the end that this cause may be reviewed and determined by this Court; that the judgment of the Circuit Court of Appeals for the Second Circuit be reversed, and that petitioner be granted such other and further relief as may be proper.

Respectfully submitted.

WILLIAM D. MITCHELL,
Attorney for Petitioner.

WALTER H. FREE,
MARK N. DONOHUE,
Of Counsel.

BRIEF IN SUPPORT OF THE PETITION

Opinions Below

The District Court's opinion (II, p. 1024) is reported in 50 F. Supp. 881. His findings are in Vol. II, p. 1048, of the record.

The opinion of the Circuit Court of Appeals (II, p. 1094) is not yet reported.

Jurisdiction

The judgment of the Circuit Court of Appeals was entered August 28, 1944 (II, p. 1094). Petition for rehearing was denied September 22, 1944 (II, p. 1120).

Jurisdiction to issue the writ rests on Section 240(a) of the Judicial Code, as amended by the Act of February 13, 1925 (28 U. S. C. 347).

Statement

The facts and rulings material to the consideration of the questions presented are fully stated in the foregoing petition.

Summary of Argument

The Points of the Argument follow the reasons relied upon for the allowance of the writ.

ARGUMENT

I. The decision of the Circuit Court of Appeals below upholds the monopoly of a patent to respondent for an improvement which, at best, requires only a low order of skill in the art to produce.

This Court has steadfastly adhered to the rule that a private grant on the public domain must be supported by the exercise of invention and not merely the skill of the calling. *Cuno Engineering Corp.* v. *Automatic Devices Corp.*, 314 U. S. 84, 91; *Altoona Publix Theatres* v. *American Tri-Ergon Corp.*, 294 U. S. 477, 486; *Atlantic Works* v. *Brady*, 107 U. S. 192, 200; *Hotchkiss* v. *Greenwood*, 11 How. 264, 267.

This case is controlled by the rule expressed in the cases cited. Gessler's ink compound, at best, required a very low order of skill for an ink compounder. As he himself stated, the suggestion of Cray that a heating device could be attached to the printing press was the key to the whole problem (I, pp. 708-9). Gessler did not conceive of the use of a heating device on the press; that was Cray's contribution (I, pp. 73, 708). Gessler did not make or invent any solvent; that was the contribution of Carbide & Carbon Corporation which had not only developed the solvent Gessler selected but had introduced it on the market and publicized those very attributes which caused Gessler to select it for his ink (I, p. 720-1; II, p. 987). When the need arose, and given the idea of a heating device on the press, and a catalogue of a solvent manufacturer advertising solvents substantially non-drying at ordinary temperatures but drying rapidly at 150° C. or thereabouts, Gessler's ink was forthcoming immediately. Only the skill of the art and not invention was required to adapt the Carbide and Carbon Chemicals Corporation's solvent (or other available solvents) to the familiar types of printers'

ink to secure the desired result. *Altoona Publix Theatres v. American Tri-Ergon Corp.*, 294 U. S. 477, 488. It was so easy and apparent that Gessler's immediate answer to Cray as he posed the "problem" was that he could do it (I, pp. 707, 73). The credit, if any, for this development belongs to Cray and to the solvent manufacturers; not to Gessler or respondent.

Gessler made a strained effort to show that between 1930, when he made his useless "odorless" ink with butyl carbitol as the solvent, and 1932, when Cray told him that heating devices could be used on the press to dry the ink, he had worked and puzzled over the problem (I, pp. 707-9). It was a somewhat flimsy effort. His complete failure was due to the fact that the use of a heating device did not occur to him. He was thinking of an ink which would stay wet on the type but dry instantly after printing *without the application of heat*—an impossible conception, and he made no progress. Had he been successful in those efforts, the resulting ink might well have been an invention; but compounding Gessler's heat-drying ink merely by selecting a solvent with the drying characteristics desired for the ink required nothing more than a very low order of skill of the calling. A skilled ink compounder merely selects those ingredients which fit his needs (I, pp. 94-6, 130, 173, 227, 513). Gessler, with the prior art before him and, in his mind, Cray's suggestion to use heating devices to dry the ink, had merely to pick and choose from available ingredients to compound his ink. In this connection, Doughty patent No. 1,439,696 (II, p. 961), disclosed heat-drying ink and specified terpinyl acetate as a suitable solvent (II, p. 961, ll. 88-91). That solvent has a vapor pressure as low as .02 mm. at ordinary temperature (20° C.) and 60 mm. at 150° C., squarely within Gessler's range (I, pp. 307-8, 321; III, Ex. E-1, D-1). Lefferts and Stevens patent No. 380,654 (II, p. 957), disclosed heat-drying inks using the solvent oil of cassia

(II, p. 958, ll. 34, 103; p. 959, ll. 6, 107, 118), which exhibits vapor pressures as low as .02 mm. at ordinary temperature (20° C.) and 40 mm. at 150° C., also squarely within Gessler's range (I, pp. 279-282, 321; III, Ex. P, Q). The Carbide and Carbon Chemicals Corporation catalogue (II, pp. 986-7) fully described the solvent Gessler finally selected. As soon as Cray told Gessler in 1932 of the fact that heating devices could be used on the presses the answer was forthcoming immediately.

No more skill was required of Gessler to compound his ink than was required of Vogt in *Altoona Public Theatres v. American Tri-Ergon Corp., supra*, to adapt a flywheel to an apparatus for recording and reproducing talking pictures to assure greater accuracy and precision of film movement. In holding Vogt's patent invalid, this Court said (294 U. S., at p. 486):

> "An improvement to an apparatus or method, to be patentable, must be the result of invention, and not the mere exercise of the skill of the calling or an advance plainly indicated by the prior art.
>
> • • •
>
> "• • • the record fails to show that there was any long-felt or generally recognized want in the motion picture industry for the device defined by the flywheel claims, or that the use of sound motion pictures was delayed by the inability of those skilled in the art to add a flywheel to the apparatus in order to give the desired uniformity of motion to linear phonograms. • • • When the need arose for a mechanism suitable to move film records with such speed-constancy as to reproduce the sound successfully, it was forthcoming. Only the skill of the art was required to adapt the flywheel device to familiar types of mechanism to secure the desired result."

This case is directly in point. The record here fails to show that there was any long-felt or generally recognized want for a heat-set ink, and that as soon as the want was

expressed and the availability of heating apparatus on the press recognized, a satisfactory ink was forthcoming immediately.

The necessity for strict adherence to the rule which excludes those devices or compounds requiring merely the skill of the calling from the reward of a private grant on the public domain was clearly stated by the Court in *Cuno Engineering Corporation* v. *Automatic Devices Corp.*, *supra*. There the Mead patent for a thermostatically controlled cigar lighter was held invalid because all that the patentee had done was to adapt the thermostatic heat controls of the prior art to a cordless cigar lighter. The resulting device, while admittedly "new and useful" was held to be the result of skill which "did not reach the level of inventive genius which the Constitution, Art. 1, Sec. 8, authorized Congress to reward". As the Court there said (314 U. S., at p. 84):

> "Strict application of that test is necessary lest in the constant demand for new appliances the heavy hand of tribute be laid on each slight technological advance in an art. The consequences of the alternative course were forcefully pointed out by Mr. Justice Bradley in Atlantic Works *v.* Brady, 107 U. S. 192, 200, 'Such an indiscriminate creation of exclusive privileges tends rather to obstruct than to stimulate invention. It creates a class of speculative schemers who make it their business to watch the advancing wave of improvement, and gather its foam in the form of patented monopolies, which enable them to lay a heavy tax upon the industry of the country, without contributing anything to the real advancement of the arts. It embarrasses the honest pursuit of business with fears and apprehensions of concealed liens and unknown liabilities to lawsuits and vexatious accountings for profits made in good faith.' . . ."

Unless this Court is receding from the rule established by these cases—that patent monopolies will not be sus-

tained for improvements requiring only ordinary skill—the decision of the Court of Appeals in this case is manifestly in conflict with the controlling decisions of this Court.

In a recent case (*Goodyear Tire & Rubber Co. v. Ray-O-Vac Co.*, 321 U. S. 275) the Court, closely divided, went to the verge of departure from this rule in sustaining as invention a rather simple device for a leak-proof dry cell battery. However, the decisive feature of that case was the application of the rule that if both the District Court and the Circuit Court of Appeals concur in their findings, in a close case, this Court will not overturn them. In the case at bar the two courts below disagreed.

In these circumstances, the decision in the *Ray-O-Vac* case can hardly be accepted as a departure from earlier decisions of this Court as to the difference between invention and ordinary skill in the art—unless decisions like the one here assailed are allowed to stand.

II. The decision of the Circuit Court of Appeals sustained as valid patent claims which, when construed to cover petitioner's ink, fail completely to particularly point out and distinctly claim the patentee's invention as required by the express provisions of R. S. 4888 and the applicable decisions of this Court.

Gessler's claims specify an ink in which the solvent ingredient has a vapor pressure of .02 mm. or less at ordinary temperature (20° C.) and a vapor pressure at 150° C. which "approximates" 40 mm. (the vapor pressure of ethyl alcohol at ordinary temperature). Respondent's solvent (I, p. 281) has a vapor pressure at 150° C. of only 20 mm. (the vapor pressure of water at ordinary temperature). The Court of Appeals held that 20 mm. vapor pressure "approximates" 40 mm. vapor pressure (II, p. 1105). It had to stretch the word "approximates" that far to find infringement.

Gessler's claims, construed so broadly, do not particularly point out and distinctly claim Gessler's alleged invention.

The record (discussed in detail at pp. 12 to 15 of the petition) clearly shows that Gessler intended the word "approximates" in his claims to define, with reasonable certainty, the lower limit of vapor pressure for his solvent at 150° C., and that by "approximates" he meant very close to 40 mm. He did not intend to include solvents, such as petitioner's petroleum solvent which, at 150° C. has a vapor pressure of only 20 mm. He was satisfied to include only those solvents which at 150° C. become "highly volatile liquids as, for example, ethyl alcohol"—solvents which would volatilize rapidly at temperatures between 100° C. and 150° C. (II, p. 733a, col. 1, l. 73–col. 2, l. 2). These are the temperatures with which Gessler's patent deals—the temperatures to which steam-heated rollers, which were the only heating devices with which Gessler had worked at the time (1932) and the only type suggested to him by Cray, could be heated without damaging the paper (I, pp. 77, 205-6). He had no conception that solvents which, at 150° C. were no more volatile than water, could be used in heat drying inks because he was not then familiar with the "flame" or "oven" type heater (introduced in 1937) which develops temperatures in excess of 1700° F. (over 900° C.) and which is necessary for the successful use of petitioner's ink (I, pp. 550-1). Hence, when Gessler chose a vapor pressure which "approximates" 40 mm. as the lower limit of vapor pressure at 150° C. for his solvent, he meant what he said—that the lower limit of volatility for his solvent at 150° C. had to be very close to 40 mm.

So construed, the patent claims satisfy the statutory requirements for definiteness and particularity, and serve to warn the public of what would and would not infringe. But, if the word "approximates" in the claims is accorded a "leeway of at least 20 mm." as the Court

of Appeals below has held, on the theory that when the patent says "approximates" 40 mm. it means "approximate it for the purpose in question, that is for making the ink dry quickly" (II, pp. 1105-6), then, in the words of this Court in *United Carbon Co.* v. *Binney and Smith Co.* (317 U. S. 228, 234), "what on first impression appears to be reasonable certainty" of definition "disappears" and Gessler's claims become nothing "but inaccurate suggestions of the functions of the product" with respect to a characteristic essential to novelty.* This Court has repeatedly held that such indefinite statements in claims do not satisfy the statutory requirement for definiteness and particularity. *United Carbon Co.* v. *Binney & Smith Co., supra; General Electric Co.* v. *Wabash Appliance Co.*, 304 U. S. 364, 369.

III. The Court of Appeals, in reversing the findings of fact of the District Court, failed to conform to Rule 52(a) of the Federal Rules of Civil Procedure.

The District Court's findings of fact appear at record Vol. II, pp. 1048-1049. These findings require the conclusions that the Gessler patent is invalid and was not infringed. Each is supported by the clear weight of the evidence. None is "clearly erroneous". In reversing the District Court, the Circuit Court of Appeals failed to conform to Rule 52(a) of the Federal Rule of Civil Procedure which states that "Findings of fact shall not be set aside unless clearly erroneous", and disregarded the decisions of this Court in *Davis* v. *Schwartz*, 155 U. S. 631, 636, and *Adamson* v. *Gilliland*, 242 U. S. 350, 353.

* So construed, Gessler's claims in suit, and the indefinite and functional claims refused him by the Patent Office (see for example claim 18 inserted by amendment August 29, 1934, II, p. 817), are identical and the effect of the decision below is to recapture for Gessler the claims he surrendered by amendment in order to obtain his patent. *Exhibit Supply Co.* v. *Ace Patents Corp.*, 315 U. S. 126, 136.

Conclusion

On the record in this case, the Writ of Certiorari should be issued to the Circuit Court of Appeals for the Second Circuit to the end that this cause may be reviewed and determined by this Court.

Respectfully submitted.

WILLIAM D. MITCHELL
Attorney for Petitioner

WALTER H. FREE
MARK N. DONOHUE
Of Counsel

FILE COPY

Office - Supreme Court, U. S.
FILED
DEC 1 1944
CHARLES ELMORE CROPLEY

IN THE

Supreme Court of the United States

October Term, 1944

No. 656

SINCLAIR & CARROLL COMPANY, INC.,
Petitioner,

v.

INTERCHEMICAL CORPORATION,
Respondent.

REPLY BRIEF FOR PETITIONER

WILLIAM D. MITCHELL,
Attorney for Petitioner.

WALTER H. FREE,
MARK N. DONOHUE,
Of Counsel.

307 BAR PRESS, INC., 47 WEST ST., NEW YORK. NO. 9—0157 - 8

IN THE

Supreme Court of the United States

October Term, 1944

No. 656

SINCLAIR & CARROLL COMPANY, INC.,
Petitioner,

v.

INTERCHEMICAL CORPORATION,
Respondent.

REPLY BRIEF FOR PETITIONER

Respondent's brief questions some statements of fact made by petitioner, and makes some statements which we think should be questioned.

The only purpose of this memorandum is to deal with those matters.

1. In attacking the District Court's findings, respondent asserts (Brief, p. 9):

> "One finding, that as to non-infringement, was directly contrary to a ruling made by the district judge after a full argument during the trial (I, pp. 239-244)."

Respondent's reference is to the District Court's denial of the usual motion to dismiss the complaint at the close of a plaintiff's *prima facie* case. The District Judge merely denied the motion without comment or "ruling" (I, p. 244).

Evidence refuting the charge of infringement was thereafter presented in petitioner's case, including the proof that the new flame type heater, as developed in 1937, made possible the use of low volatility inks like petitioner's, with a solvent vapor pressure as low as 20 mm. at 150° C. (I, p. 551). *That fact alone was enough to show that Gessler, when he used the term "approximates" 40 mm. had no conception that an ink with 20 mm. solvent vapor pressure at 150° C. could be used.* It was persuasive proof that he did not himself consider that an ink with 20 mm. solvent vapor pressure at 150° C. was an ink with a solvent vapor pressure approximating 40 mm. at 150° C.

2. Respondent states (Brief, p. 14):

> "By ignoring the proof showing that heating devices had long been used on printing presses, the petitioner can assert that the information which Mr. Cray gave Gessler as to this feature of the prior art was the real basis of the invention."

Petitioner has not ignored proof showing that heating devices had long been used on printing presses. The fact is that there is no proof that heating devices had been *used* on printing presses of the kind with which Gessler was concerned prior to the time Cray suggested the use of such heating devices to Gessler in 1932 (I, pp. 73, 706-709). In each instance referred to in the record, of the first use of heat drying ink, the press had to be altered to equip it with a heater: Paterson Parchment Paper Co. (I, p. 74), Conde Nast Press (I, p. 154), W. F. Hall Co. (I, pp. 513, 515, 551), R. R. Donnelly & Sons (I, pp.

588-590, 605-606), Kalamazoo Vegetable Parchment Co. (I, pp. 190, 195), Benjamin C. Betner Co. (I, p. 614).

Prior to Cray's suggestion, in 1932, to use a heater on the press, low temperature heating equipment, such as steam drums or rollers, had been used on rotogravure presses, and the idea of using heat was suggested to Cray by the rotogravure practice. To use Cray's words (I, p. 97):

> "I had often thought of that, because there was a big rotogravure company in the same offices, and it used to break my heart to go down and see them dry by going over some drum."

but no such heating equipment was used on ordinary fast printing presses so far as this record shows.

Furthermore, respondent misses the point.

The flame type heater, developed in 1937, which brings the printed paper in close proximity to an actual flame, made possible the use of an ink, like petitioner's, with a solvent having a vapor pressure at 150° C. as low as 20 mm. (I, pp. 550-551). When interpreting the word "approximates" in the claims, and deciding whether petitioner's ink with 20 mm. solvent vapor pressure at 150° C. "approximates" one with 40 mm. solvent vapor pressure at 150° C., the interpretation should be made in the light of the available knowledge at the time the claims were drawn. If Gessler had no idea that an ink containing a solvent of 20 mm. vapor pressure could be used, is it not conclusive that he did not draw his claims to cover such an ink?

3. Respondent states (Brief, p. 17):

> "Actually petitioner's ink, like that described in the patent, dries instantly at 150° C. This is conclusively proved by demonstrations in Court (I, pp.

32-40, 51), and by commercial use of the ink on the same press on which the patented ink had been used" (I, pp. 237-238).

This statement is erroneous as to both stated sources. There was no demonstration in Court or elsewhere that petitioner's ink "dries instantly at 150° C." The record is barren of such proof. The Court demonstrations made were with alcohol and butyl acetate, both evaporating rapidly at room temperature (I, pp. 33-35). Neither is used in petitioner's ink. At Record page 51, plaintiff's expert, Bragdon, merely expressed the opinion, without demonstration, that defendant's "502C" solvent "would evaporate at just about the same rate at 150 degrees Centigrade, as Exhibit 9" (butyl acetate). As butyl acetate evaporates rapidly at room temperature, it will all have disappeared long before the temperature of 150° C. is reached. The record shows that defendant's ink is dried in flame type ovens having temperatures as high as 500°-1000° C. (I, pp. 550, 505), far above the 260° C. (500° F.) temperature which Gessler's patent file wrapper stated "is much higher than that which could be used in the successful operation of applicant's process" (II, p. 840).

4. Respondent states (Brief, p. 2):

> "High speed rotary printing presses, like those used today, were in general use for at least thirty years before 1932. They were used solely for printing on soft, absorbent paper, like newspaper. They could not be used for high-grade printing on smooth paper because there was no printing ink which could be instantly dried. Attempts to do high-grade printing on high speed presses began at least as early as 1917 and were all failures up to 1932."

Before 1932, high speed rotary presses were used successfully "on softer papers, more absorbent papers, print papers and E. G.'s, English finishes". Heat drying inks made the printing operation "Somewhat speedier * * *. There is some increase in production" (I, p. 601). Even today the proportion of linseed oil ink (which respondent infers has been replaced by Gessler's heat drying ink), is still far greater than the amount of heat drying ink sold (I, p. 227).

5. Respondent states (Brief, p. 6):

> "The court tests proved that both butyl acetate and toluol have substantially the same volatility as alcohol (I, pp. 662-666). Thus, the highly volatile solvents of which alcohol is typical, have vapor pressures which approximate that of alcohol within a few centimeters * * *" (and at top of page 8): Petitioner's solvent "at the high temperature mentioned in the claims (150° C.) [it] has a vapor pressure of 2 cm. (20 mm.) which is equal to that of the liquid, toluol, which has the same volatility as the typical highly volatile liquid, alcohol * * *."

The utter unreliability of the "court tests" referred to is evident from the record (I, pp. 662, 665, 666), where it is shown that, in the crude tests applied by respondent's expert, toluol, having ½ the vapor pressure of alcohol, evaporated *faster* than alcohol, despite the fact that this same expert had previously testified (I, p. 58) that alcohol evaporates at room temperature at a faster rate than water, because alcohol has a higher vapor pressure than water at room temperature.

6. Respondent states (Brief, p. 7) that:

> "the patented ink had gone into extensive use" when petitioner's ink appeared on the market (in 1938).

This statement begs the very issue upon which it is based. The question is whether respondent's patent covers the commercially successful petroleum solvent inks, of which petitioner's ink is one.

The butyl carbitol ink described in the patent was a commercial failure. Only 30,000 pounds have been sold over a period of three years and its sale virtually stopped in 1936 (I, pp. 225, 226, 951). It cannot be used on the usual high speed presses because of its damaging effect upon the inking rollers (I, pp. 91, 92, 121, 142; II, pp. 766, 767). The really commercially successful heat drying inks, which use a petroleum solvent (I, pp. 88, 89), were first introduced in 1933 at Curtis Publishing Company by Fred'k H. Levey Co., four years before Gessler's patent issued (I, pp. 82-84, 586). Levey, also in 1933, purchased the Doughty heat-drying ink patents (I, p. 694; II, pp. 1021-23), which disclosed the petroleum solvents then and now used in the commercially successful heat-drying inks, and which expired in 1939 (II, p. 962, ll. 16-20; I, pp. 292-295, 299-304).

7. The respondent (Brief, p. 13) criticizes Kerley's testimony that (I, p. 551):

> "without an oven you could not run any of them" (the commercial heat drying inks using petroleum solvents, such as petitioner's) and that the "first good oven" was put into operation "about 1937."

Kerley's testimony stands uncontroverted on the record. There is not one word of testimony indicating that a petroleum solvent ink could be used successfully with the low temperature steam drum type dryer suggested by Cray to Gessler in 1932 (I, pp. 73, 707-709). The only type of ink solvent that Gessler found could be used with that steam drum or roller type of drying equipment was butyl carbitol (I, pp. 707, 720). Even then, as the experience

with the Paterson Paper Parchment Co. test shows, the steam drum type dryer damaged the paper (I, pp. 89, 90). Petroleum solvent inks, like petitioner's, require the new flame type heating equipment as developed in 1937 for successful use (I, p. 551).

Respectfully submitted,

WILLIAM D. MITCHELL,
Attorney for Petitioner.

WALTER H. FREE,
MARK N. DONOHUE,
Of Counsel.

FILE COPY

Office - Supreme Court, U. S.
FILED
FEB 27 1945
CHARLES ELMORE CROPLEY
CLERK

IN THE

Supreme Court of the United States

OCTOBER TERM, 1944.

No. 656.

SINCLAIR & CARROLL COMPANY, INC.,
Petitioner,

v.

INTERCHEMICAL CORPORATION,
Respondent.

ON WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SECOND CIRCUIT.

BRIEF FOR PETITIONER.

WILLIAM D. MITCHELL,
WALTER H. FREE,
MARK N. DONOHUE,
Counsel for Petitioner.

THE COURT PRESS, N. Y. C.

INDEX.

	PAGE
Opinions Below	1
Jurisdiction	1
Questions Presented	2
The Statute Involved	2
Statement	3
The Patent	3
The Fast Rotary Press	7
Gessler's Contribution	8
Prior Patents and Publications	12
Commercial Success and Long Felt Want	15
Infringement	19
Specification of Errors	24
Summary of Argument	25
Argument	26
I. The patent is void for want of invention. It discloses only the application of ordinary skill in the art	26
II. Infringement	32
III. The findings of the District Court were not clearly erroneous	35

Table of Cases Cited:

Adamson v. Gilliland, 242 U. S. 350, 353 35
Altoona Publix Theatres Inc. v. American Tri-Ergon Corp., et al., 294 U. S. 477, 486, 488 ..... 26, 30
Atlantic Works v. Brady, 107 U. S. 192, 200 26
Concrete Appliances Co. v. Gomery, 269 U. S. 177, 180 ..... 26, 27
Cuno Engineering Corp. v. Automatic Devices Corp., 314 U. S. 84, 90, 91, 94 (1941) 26, 32

PAGE

Davis v. Schwartz, 155 U. S. 631 35

Exhibit Supply Co. v. Ace Patents Corp., 315 U. S. 126, 136 35

Firestone Tire & Rubber Co. v. United States Rubber Co., 79 F. (2d) 948, 954 31

Farrer v. Ferris, 145 U. S. 132 35

Goodyear Tire & Rubber Co. v. Ray-O-Vac Co., 321 U. S. 275 36

Hotchkiss v. Greenwood, 11 How. 264, 267 26

Kimberly v. Arms, 129 U. S. 512, 524 35

Paramount Publix Corp. v. American Tri-Ergon Corp., 294 U. S. 464, 476 ..... 29, 30

Silver King Coalition Mines Co. v. Silver King Consol. Mining Co., 204 Fed. 166 35

Tilghman v. Proctor, 125 U. S. 136, 149 35

Toledo Pressed Steel Co. v. Standard Parts, Inc., 307 U. S. 350, 356 29

United Carbon Co. et al. v. Binney & Smith Co., 317 U. S. 228, 236 35

Warren v. Keep, 155 U. S. 265 35

OTHER AUTHORITIES CITED:

Federal Rules of Civil Procedure, Rule 52(a) 35

Judicial Code, as amended by the Act of February 13, 1925 (U. S. C., Title 28, Sec. 347), Section 240(a) 2

35 U. S. C., Sec. 33 (R. S. Sec. 4888; Mar. 3, 1915, c. 94, Sec. 1, 38 Stat. 958) 2, 3, 7, 25, 26, 35

IN THE

Supreme Court of the United States

OCTOBER TERM, 1944.

No. 656.

SINCLAIR & CARROLL COMPANY, INC.,
Petitioner,

v.

INTERCHEMICAL CORPORATION,
Respondent.

ON WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SECOND CIRCUIT.

BRIEF FOR PETITIONER.

Opinions Below.

The opinion of the District Court (II, 1024*) is reported in 50 F. Supp. 881. The opinion of the Circuit Court of Appeals (II, 1094) is reported in 144 F. (2d) 842.

Jurisdiction.

The judgment of the Circuit Court of Appeals was entered August 28, 1944 (II, 1094). Petition for rehearing was denied September 22, 1944 (II, 1118). Petition for certiorari was filed November 6, 1944, and granted December 11, 1944. Jurisdiction rests

* Roman numerals in parentheses indicate record volume.

on Section 240(a) of the Judicial Code, as amended by the Act of February 13, 1925 (U. S. C., Title 28, Sec. 347).

Questions Presented.

This is a patent infringement action. The petitioner here was defendant in the District Court. The District Court held the patent void for want of invention and because anticipated by prior patents, and also held that there was no infringement. The Circuit Court of Appeals reversed these findings and held the patent valid and infringed.

Petitioner contends:

(1) That nothing done by the patentee required more than ordinary skill in the art;

(2) That the petitioner's ink does not infringe because not within the scope of the patent claims unless those claims are construed more broadly than allowed by R. S. 4888, and

(3) That the findings of the District Court were not "clearly erroneous" and should not have been set aside.

The Statute Involved.

35 U. S. C., Sec. 33. *Application for patent; description; specification and claim.* Before any inventor or discoverer shall receive a patent for his invention or discovery he shall make application therefor, in writing, to the Commissioner of Patents, and shall file in the Patent Office a written description of the same, and of the manner and process of making, constructing, compound-

ing, and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art or science to which it appertains, or with which it is most nearly connected, to make, construct, compound, and use the same; and in case of a machine, he shall explain the principle thereof, and the best mode in which he has contemplated applying that principle, so as to distinguish it from other inventions; and he shall particularly point out and distinctly claim the part, improvement, or combination which he claims as his invention or discovery. The specification and claim shall be signed by the inventor. (R. S. Sec. 4888; Mar. 3, 1915, c. 94, Sec. 1, 38 Stat. 958.)

Statement.

The Patent.

The patent, No. 2,087,190 (II, 733) is for a printing ink. It was issued to Albert E. Gessler July 13, 1937, on an application filed July 14, 1932, forfeited April 10, 1936, renewed April 11, 1936, and assigned to respondent's predecessor. Claims 3, 10, 11, 12 and 13 are in suit. Claim 3, which is typical and here used as the basis for discussion, is as follows:

> A printing ink which is substantially non-drying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component completely dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink—the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, substantially all of the

liquid component having a vapor pressure at 20° C. as low as that of diethylene glycol monobutyl ether at 20° C., and the major part of the liquid component having a vapor pressure which at 150° C. approximates that of ethyl alcohol at ordinary temperatures and forming a stable solution with the solid component.

Claim 3 needs translation. The term "ordinary temperatures" appears in line two. In the record the witnesses sometimes substitute the phrase "room temperature". The claim and the witnesses mean a temperature of about 20° Centigrade (68° Fahrenheit). That is why 20° C. is used in the claim.

Vapor pressure is used to indicate volatility or rate of evaporation. When a liquid evaporates, molecules of vapor are emitted which create a pressure against the surrounding atmosphere. The application of heat increases the rate of evaporation, and the more rapid the evaporation, the greater is the vapor pressure. That pressure is measured and expressed in terms of the height of a column of mercury which the pressure would support, just as atmospheric pressure is indicated. In the patent the height of the mercury column is stated in millimeters.

The short or trade name for the diethylene glycol monobutyl ether, mentioned in the claim, is "butyl carbitol" (I, 28). It has a vapor pressure at 20° C. (ordinary temperature, 68° F.) of only .02 millimeters of mercury, and a vapor pressure of 50 mm. at 150° C. The ethyl alcohol mentioned in the claim has a vapor pressure at ordinary temperatures of 40 mm. (II, 733a.-Col. 1, l. 53—Col. 2, l. 2.)

The claim is the same as if it read:

"substantially all of the liquid component having a vapor pressure at ordinary room temperature

(20° C.) as low as .02 millimeters, and the major part of the liquid component having a vapor pressure which at 150° C. approximates 40 mm."

This shows that the solvent in the patented ink, at room temperatures, has a slow evaporation rate and remains wet on the type, but becomes highly volatile when heated to 150° C.

The patent is not for a process or method of using ink, but merely for a compound—a composition of matter.

The ink is a "heat-set" ink, one whose liquid component or solvent does not evaporate or dry at room temperature, hence causes the ink to stay moist on the type and inking rollers, but which will evaporate instantly on application of heat to the printed paper. The use of the ink requires a heating device on the press. The ink is of special utility on modern high speed rotary presses for printing on glossy, non-absorbent paper; provided the press is equipped with a heating device, as it makes possible the immediate printing of the reverse side and the folding of the pages, without smudging the ink.

The patentee did not initiate the idea of using a heating device. That was suggested to him by another. Neither did he discover or invent an ink solvent which stays wet at room temperature and dries instantly on application of heat. Such solvents were on the market, and their characteristics advertised. When requested by an ink maker to furnish such a "heat-set" ink for use on a press to be equipped with a heater, he merely used a suitable solvent, made and advertised by chemical manufacturers, to compound his ink.

Respondent's position is that Gessler's invention consisted in "discovering and disclosing *how to select*" the solvent (Respondent's Brief in Opposition to Certiorari, p. 12).

Petitioner contends that the conception that a "heat-set" ink could be made by use of a known solvent, known to have a low evaporation rate at ordinary temperature, and a high evaporation rate at high temperatures, and the selection of such a solvent from the catalog of a chemical manufacturer, was not invention or anything more than ordinary skill in the art; and that this is particularly true in view of the fact that prior patents and publications taught the making of inks with solvents non-volatile at ordinary temperature and highly volatile on heating.

Petitioner also contends that the patent is not infringed. The patent states that the solvent in the claimed ink must be non-volatile at ordinary temperature, but at 150° C. must have a vapor pressure (evaporation rate) which "approximates" 40 mm. (that of ethyl alcohol at ordinary temperature).

The solvent in petitioner's ink is not volatile at ordinary temperature, but at 150° C. its vapor pressure (evaporation rate) is only 20 mm. (about that of water and only one-half that of ethyl alcohol at ordinary temperature).

The precise question is whether 20 mm. "approximates" 40 mm. Respondent asserts it does. Petitioner contends that it does not. Petitioner's position is that Gessler himself, when drafting the claim, did not have in mind a solvent of such a low vapor pressure as 20 mm. at 150° C.; that Gessler did not then know of any form of heating device with which such a solvent could be used, and that to construe the claim to include the petitioner's ink would depart

from R. S. 4888, requiring the patentee to describe his invention in "clear, concise, and exact terms", and "particularly point out and distinctly claim" it.

Petitioner also contends that the findings of the District Court were amply supported by the evidence, and that in overturning them the Court below departed from the rule that such findings may not be set aside unless clearly erroneous.

The Fast Rotary Press.

The modern high-speed rotary printing press into which is fed a continuous "web" or strip of paper, which is printed by contact with rapidly revolving printing cylinders, is and has been for many years in common use (I, 148, 605). Ink used in such presses, as with other presses, must be of a kind which stays moist indefinitely at room temperatures and does not dry on the inking rollers and type (I, 704). When printed on absorbent paper, such as newsprint, it is not necessary that the ink dry quickly after printing or that any heater for that purpose be attached to the press. The paper absorbs the ink, and after the paper is printed on one side, it may pass immediately over other rollers and be printed on the other side, and then pass immediately to cutting and folding devices, all without smearing or smudging (I, 587, 601). Printing on non-absorbent or glossy paper, generally used in magazines, presents a different problem. When printed on one side of the paper, the ink is not absorbed, and if it remains wet, it is easily smudged or rubbed off. Printing on the other side must be delayed until the ink on the one side is dried (I, 592). An ink which dries quickly at room temperatures cannot

be used, as it dries equally quickly on the rollers and type (I, 704). Prior to 1932, printing of magazines on glossy or non-absorbent papers was not generally done on the high speed presses such as are used for newspapers. Usually sheets, not continuous strips, were pressed on flat plates, and after printing one side, were laid aside for a time until dry and then printed on the other side, and after that the cutting and folding were further delayed (I, 587, 588, 592, 600). If rotary presses were used with smooth paper, there was a delay after printing one side, to permit drying, and another delay before folding (I, 149-50, 611-13).

Solvents for use in inks, and which would stay wet on the rollers and type but would dry instantly on application of heat had long been available, and inks containing such solvents had been known and made (I, 251-2, 261-6, 283-8, 320-2, 414-19, 690; II, 957, 961, 983, 985), but no one seems to have provided the fast rotary presses with heating devices to dry the ink instantly after printing so as to permit use of such presses on non-absorbent paper (I, 73, 74, 153-4, 190, 195, 513, 551, 588-9, 605-6).

Gessler's Contribution.

In 1930 Gessler, a chemist, was employed by Zinsser & Co., makers of chemicals, pigments and dyes (I, 109). Frank W. Cray was in the printing ink business with Cray-Finne Corporation, with which Gessler's company did business (I, 65, 72). In June, 1930, Cray asked Gessler to prepare an *odorless* printing ink, and Gessler prepared some samples (I, 72, 109, 702). In this work, Gessler wanted an odorless solvent which would stay wet at ordinary

temperatures. To find it, he examined the catalogues (II, 985-8; III, Ex. U-2) of Carbide and Carbon Chemicals Corporation, a manufacturer of chemical products, and found advertised there three solvents which seemed suitable for the ink, which he tried out. He discarded two and finally selected butyl carbitol (I, 719-722). The catalogue of January 1, 1929 (II, 987-8), described butyl carbitol. Gessler observed from the catalogue that butyl carbitol has a mild odor, and that it has a vapor pressure of only .05 mm. at 20° C., and a boiling point of 222° C., and therefore would not dry at room temperature. He selected it as a solvent for an odorless ink which would stay wet on the rollers and type and not harden on the press. This odorless ink was unsatisfactory because it stayed wet too long on the paper (I, 72-3). At that time (1930), although Gessler noticed that butyl carbitol is highly volatile on application of heat, and the catalogue indicated that characteristic (I, 720), he was not then interested in whether the ink would dry on application of heat, and no suggestion for putting a heating device on a press was made. However, late in 1931 Cray thought of heat for drying the ink after printing on a fast press and again went to Gessler. Cray testified (I, 73):

> "So I got hold of Dr. Gessler, and I discussed that point with him. I said, 'Could you make me an ink that would be dry after being printed? *We can put it over some kind of a heating device.*' He said, 'Yes, I think we could.' He said, 'In fact, one of those inks I made for you in the beginning would do that.'" (Italics ours.)

It was as easy as that. The old samples of the odorless ink made in 1930 were found to have dried.

so in February, 1932, Gessler made up new samples, and as Cray said, "I was able to make a print of that and pass that print over a hot plate and dry the ink. From there on we went to work" (I, 74).

Of this incident Gessler said:

> "Q. Did Mr. Cray ask you to furnish him an ink which could be used on a press provided with a heater? A. Yes, he did" (I, 706).

Again:

> "And now, when Mr. Cray came, in the year 1932, and told me that heating units, steam-heated rollers are used on printing presses, that was the last key that I needed for the solution of the problem. I had not known that before, and I knew that if I could apply any heat to the thin film of those inks that they would dry almost instantaneously" (I, 708-9).

Cray had not said that heated rollers were in use, but that they could be supplied. For test purposes he converted some cooling drums into heaters, by substituting steam for the cooling brine (I, 74).

The record shows that it was Cray, not Gessler, who thought of using heating devices on the press, and that solvents for ink, with the required characteristics, were well known, made by others, not Gessler.

The patent, of course, is for a printing ink, and not for a method or process, or for the use of a heater. In April, 1935, Gessler filed an application for a method patent, covering the combined use of a heat set ink and a heating device (II, 733a, col. 2, ll. 28-32). He later abandoned that application (I, 129-30). The use of a heater was conceived by Cray,

not Gessler, and Gessler could not properly claim to be the inventor of that method (I, 73, 97, 708-9).

The claims in suit cover every ink containing a solvent having the specified vapor pressures at ordinary temperature (20° C.) and at elevated temperature (150° C.), *regardless of why it is put in the ink.*

Gessler was not a mechanic: he was a chemist. The suggestion for a heating device, which Gessler himself said was the "key" to the problem, coming from Cray, left to Gessler only the task of selecting a solvent, non-volatile at room temperature, but highly volatile at elevated temperatures. He did not discover or make the solvent: It was ready to his hand. Indeed, when the problem of compounding a heat set ink was presented to him, the solution was instantaneous and required no reflection. He had already made such an ink in 1930 as an odorless ink, and at least one suitable solvent had been on the market to his own knowledge for at least three years.

It is this "selection" of a solvent which respondent claims to be invention. In its brief in opposition to certiorari respondent said:

> "Gessler discovered and disclosed that it *is* possible to produce the desired ink by selection from known solvents" (p. 4).

Also, that his accomplishment was

> "discovering and disclosing *how to select* the principal ingredient of the compound" (p. 12).

Prior Patents and Publications

Patent No. 1,439,696, issued to Doughty in 1922 (II, 961), covered a composition of ink. The inventor had in mind particularly an ink with metallic pigments suitable for stamping titles and designs on bookbindings, but also "for other purposes to which the ink may be adapted" (II, 961, ll. 12-17). He stated:

> "A difficulty which has prevented the use of metallic pigment inks is due to vehicles which dry too rapidly on the inking rolls, covering them generally with a gummy coating which prevents transfer of the ink to the type or die. In avoiding this extreme it is necessary to provide an ink which when once applied will dry rapidly.
>
> It is the object of the invention, therefore, to provide an ink and an ink vehicle having the necessary properties, among others comparative slowness in drying without a tendency to become gummy, a consistency permitting transference of the ink through inking rolls to the type or die, rapid drying when applied to the work, and ability to protect the pigment from oxidation and consequent discoloration.
>
> I have discovered that these desirable properties may be imparted to the ink by the use of a suitable medium in the vehicle for the pigment and that such a medium will, moreover, permit rapid drying of the ink by the application of heat to the type or die" (II, 961, ll. 38-61).

Doughty stated that the medium (solvent) should be "capable of being vaporized * * * but its boiling point should be relatively high to reduce vaporization at atmospheric temperatures, and consequently to prevent rapid drying on the inking rolls" and that

"Solvents boiling materially below 200° C. are unsuitable because the ink dries too rapidly on the rolls" (II, 961, ll. 62-74).

Among suitable solvents Doughty named terpinyl acetate (II, 961, l. 90). It has the same vapor pressure as butyl carbitol (the solvent around which Gessler's claims are built), viz., about .02 mm. at ordinary temperature, and about 60 mm. at 150° C., and has a boiling point of about 222° C. (I, 306-8; II, 1099; III, Exs. D-1, E-1, J).

Doughty's idea of a heating device to dry the ink after printing was to heat the type or die itself and apply heat that way. He stated:

> "The ink dries very slowly at atmospheric temperature owing to the high boiling point of the volatile solvent. It dries rapidly, however, when applied with a heated die" (II, 962, ll. 58-61).

His specifications teach unmistakably that a composition of ink which is not volatile at room temperatures, and hence non-drying on the inking rolls or type, but which will dry quickly by application of heat after printing, may be made by the use of a solvent, non-volatile at room temperature, but with a boiling point between 200° C. and 300° C. If Doughty's patent had been later than Gessler's, this ink disclosed by Doughty would clearly infringe Gessler's claims.

The patent to Lefferts and Stevens, No. 380,654, issued in 1888 (II, 957), covers a composition of ink. Lefferts' specifications teach the use of heat after printing for drying, and solvents which keep the ink from drying before printing (II, 958, ll. 62-68, 75-80, 109-114). True, the primary purpose

was to produce an ink with a solvent which would dissolve celluloid (pyroxylin) surfaces on which printing is done, and cause the ink to penetrate and thus adhere to the printed surface, just as butyl carbitol is a celluloid (pyroxylin) solvent (II, 987). The patent recommends oil of cassia as a solvent for an ink and claims 3 and 5 cover that ink (II, 958, ll. 33-44, 103; 959, ll. 6, 108, 118). The oil of cassia available today has a vapor pressure as low as .02 mm. at 20° C. and of 40 mm. at 150° C. Hence Lefferts' oil of cassia ink comes squarely within the terms of Gessler's claims and if made today would infringe Gessler's patent (I, 280-2, 321-2; III, Exs. P, Q). The Court of Appeals brushed this patent aside, stating there was no proof that the oil of cassia of 1888 had the same characteristics as oil of cassia of 1942, although one witness said it is the natural essence of a plant, and is accepted as being the same (I, 332, 336).

The patent to Jirousek, No. 1,954,627, applied for April 18, 1932 (II, 983) was rejected by the Court of Appeals as not being a proper reference against Gessler, because, although Jirousek described heat-set ink, the ink also contains some linseed oil, which Gessler excludes. But Jirousek's specifications are pertinent as bearing on the question whether Gessler did more than exercise ordinary skill. Jirousek's patent discloses ink containing solvent mixtures which remain wet at normal temperatures, which have high boiling points, and which dry quickly on application of heat (II, 983, ll. 71-78, 97-103; 984, ll. 8-15; I, 313-6, 414-19, 427-9, 468).

The article by M. E. Hanson, published in Printing Equipment Engineer in December, 1931 (II, 990), was discarded by the Court of Appeals as merely

stating the problem without giving a solution. In Hanson's statement of the characteristics desired for a plastic ink "for rapid drying", he included the requirements that the ink would not dry on the rolls at room temperature, but would "dry in a small fraction of a second" on application of heat to the printed sheet. He did more than merely state the problem. He pointed out that the solution of the problem lay in the use of solvents having evaporation characteristics such that, at room temperature, the ink does not dry, but dries instantly on application of the highest heat that can be practically applied to the printed paper. Hanson's article was really a suggestion that chemical manufacturers conduct further research to produce the desired solvents. He evidently had not examined the 1929 and 1930 catalogues of Carbide and Carbon Chemicals Corporation (II, 985-8; III, Ex. U-2) which revealed such a solvent.

With Hanson's article and some of the prior patents before him, the Carbide and Carbon Chemicals Corporation's catalogue in his hand, and in his mind Cray's great news that a heating device could be attached to a fast press, did a chemist need to exercise more than ordinary skill in the art of chemistry to "select" a solvent and prepare the desired composition of ink?

Commercial Success and Long Felt Want.

The discussion on pages 29-31 of this brief about the bearing of these factors on the issue of invention indicates that commercial success has little importance on the question whether the improvement resulted from ordinary skill, and that the importance of a "long felt want" depends on whether the "want" was

articulate and resulted in attempts to solve it, which had failed.

The record shows that the commercial success of Cray's conception of combining a heating device on a rotary press with the use of heat-set ink has been great. Many of the magazines having a large circulation are now printed in that manner (I, 153-6, 236-7, 587-8, 623, 632) with great saving in time and labor and with other advantages (I, 154, 588, 596, 598, 613, 624).

This has all developed since 1932 (I, 83, 84, 88, 101, 128, 129, 153, 187, 191, 586). Since that time, and while Gessler's application was still pending, many makers of printing ink developed "heat-set" inks containing petroleum solvents (I, 82-5, 129, 506, 586, 603, 641). Doubtless what Cray was doing with heaters and test runs in printing houses was noised about, and stirred the ink makers to action.

In the meantime, Gessler's butyl carbitol was soon found to damage glycerine-glue inking rollers, and could only be used on rollers of rubber or other material (I, 91-2, 120-5; II, 766-7). Furthermore, butyl carbitol ink is *eight times* more expensive than the petroleum solvent ink (I, 86). Such a cost is important to printers using hundreds of tons of ink in a year (I, 101-2, 227, 570). Since 1936 butyl carbitol inks have been used only in small quantities, by Kalamazoo Vegetable Parchment Company (less than 1% of its ink requirements), whose business requires an odorless ink and which is willing to pay a high price for it (I, 200-3, 226; II, 955).

The respondent's predecessor first used butyl carbitol. In 1934 it changed to butyl carbitol *acetate*, which does not damage glue-glycerine rollers, and in 1935 changed to petroleum solvents (I, 89, 91, 124, 129,

134; II, 950-2). The heat-set inks made by the Levey Company seem to have contained petroleum solvents during and since 1933 (I, 84, 88, 102, 129).

Petroleum solvents having much lower vapor pressure at 150° C. than 40 mm. have been the successful solvents (I, 88-9, 102, 127-9, 631, 641, 672; III, Exs. B-1, R-2). The accused ink of the petitioner contains a petroleum solvent referred to in the record as "502-C oil" and having a vapor pressure of only 20 mm. at 150° C. (I, 50, 56, 240, 281, 306; II, 741; III, Exs. O, P, Q). These petroleum solvent inks with lower volatility than butyl carbitol ink have required flame heaters instead of steam heated drums to dry them (I, 68, 70, 92-3, 128, 550-1, 158, 505, 515, 606, 615, 617, 631-2).

The commercial success has been due to use of the cheaper petroleum solvents, and to the flame heaters, neither of which Gessler had in mind (I, 551). These factors are more fully developed under the discussion of infringement on pages 19-24 of this brief.

The record shows that commercial success has been fundamentally the result of Cray's conception of using heating devices, plus the development of new flame heaters and the selection by others than Gessler of a cheap solvent, with a lower vapor pressure at 150° C. than that specified by Gessler. Gessler's patent is for ink alone.

As to "long felt want", the record is barren of any evidence that prior to the time Cray went to Gessler with the request for a heat-set ink, any chemist or maker of printing ink had tried and failed to compound such an ink. Prior patents (pp. 12-15, *supra*) disclose that heat-set inks had been occasionally made for purposes there stated. One witness made the bald assertion that there had been a "demand" for twenty

years for a way of drying ink after printing on rotary presses (I, 627). Obviously, he meant that during all that period it would have helped printers if they had had heating devices and heat set inks. He said he himself had first begun to think "along those lines" when Life magazine first came out (1937, I, 629). If there was a "demand" or need in connection with fast rotary presses, the record does not show that anyone had given voice to it prior to 1931, and there is no evidence that anyone had tried and failed to compound a suitable heat-set ink. Cray said that one of his customers pressed him about it in 1931 (I, 73). He then supplied the "key" by his proposal to attach heaters to the presses, and then put to Gessler his request for the ink, which was forthcoming at once (I, 708-9).

The record definitely establishes that the failure of magazine printers to adopt a method for using fast rotary presses with heat set inks, was *not* due to any difficulty in compounding a heat-set ink. The record only suggests the real reasons for delay. Up to fifteen years ago, the circulation of the publications may not have been large enough to justify the expense for machinery. Printers have heavy investments in presses. It cost one printer $100,000 to supply one old press with a heating device (I, 571). Since the low cost petroleum inks and flame heaters were developed, one printer has spent $500,000 for three presses for only one magazine (I, 153). The delay may have been the result of mere inertia.

Infringement.

The claim requires that substantially all of the liquid component of the ink shall have a vapor pressure as low as that of butyl carbitol (.02 mm.) at ordinary temperature (20° C.). The "502-C oil" solvent in the accused ink has that characteristic. The claim also requires that the major portion of the liquid component shall have a vapor pressure "which at 150° C. approximates" 40 mm. Petitioner's ink solvent, at 150° C. has a vapor pressure of only 20 mm. (I, 50, 56, 240, 281, 306; II, 741). 40 mm. is the vapor pressure of ethyl alcohol at ordinary temperature (II, 733a, col. 1, l. 73; col. 2, l. 2). 20 mm. is about the vapor pressure of water at ordinary temperature (I, 317-8; III, Ex. A).

The question of infringement turns on whether a vapor pressure of 20 mm. "approximates" one of 40 mm. There is much in the record which discloses the conditions and the knowledge of the patentee in the light of which the claim was drawn and is to be interpreted. Why the patentee chose approximately 40 mm. as his standard is obvious. None of the claims he had drawn prior to September 28, 1935, contained any specification of vapor pressure on application of heat. His original claim 7 was for a solvent

> "characterized by a rapid rise in its vapor pressure curve at elevated temperatures" (II, 779).

Claims added as late as January, 1935, stated:

> "a vapor pressure at elevated temperatures sufficiently high to cause rapid evaporation of the solvent" (II, 835).

It was not until September 28, 1935 (II, 873-7), that claims then added contained the statement describing the solvent as one having a vapor pressure which "at 150° C. approximates that of ethyl alcohol at ordinary temperatures" (40 mm.).

Gessler's first selection was the solvent butyl carbitol with a vapor pressure of 60 mm. at 150° C. That is the only solvent he had in mind until 1934 (I, 707, 720; II, 733a, col. 1, l. 71). But by spring of 1934 his butyl carbitol ink was found to damage printing rollers made of glue-glycerine (I, 91-2, 121-4; II, 766-67b).

Gessler went to the Mellon Institute at Pittsburgh to get a solvent that would not damage the rollers, and was told about new solvents the Institute had worked out, one of which was butyl carbitol acetate (I, 134). *That has a vapor pressure at 150° C. of 40 mm.* (I, 125-6; II, 767a, col. 1, ll. 64-75).

He then, on March 17, 1934, applied for and there was issued to him August 30, 1938, another patent with one claim which specified butyl carbitol *acetate* as the solvent (II, 767).

On September 28, 1935, forced by the Patent Office to be specific, Gessler cancelled his earlier claims for the patent in suit and substituted others, in which he adopted the 40 mm. at 150° C. vapor pressure of the acetate as his standard (II, 873-77). In his specification for the acetate patent, speaking of the acetate, he said (II, 767a, col. 1, l. 73):

> "its vapor pressure at 150° C. approximates the vapor pressure of ethyl alcohol at ordinary temperatures (about 40.0 mm. of mercury)."

Thus, comparing the acetate, which has a vapor pressure at 150° C. of about 40 mm., with alcohol, which has a vapor pressure of 40 mm. at ordinary temperature, he states that the one "approximates" the other, showing that he meant by "approximates" that they were about the same.

That is how he decided on the 40 mm. standard.

The record also justifies the conclusion that when he finally used the term "approximates" 40 mm., he knew of no type of heater to safely apply a heat which would instantly dry a solvent with a vapor pressure at 150° C. as low as 20 mm. Cray had suggested only the drum or roller heated by steam (I, 73-4, 97, 708-9). That was used with the butyl carbitol inks (I, 81, 132, 190, 198, 213).

From then on Gessler thought in terms of steam heated drums or rollers (II, 763, l. 19; I, 722). The flame heater for fast rotary presses, now used for the low vapor pressure petroleum inks, was not developed until 1936 or 1937 (I, 551). This statement was challenged in the respondent's brief in opposition to certiorari (p. 13), citing the Brunell patent of 1926 (II, 1000), for a method of using a gas burner to dry, or rather crystalize the ink after printing, just enough to remove the static electricity which caused the paper to cling to the rollers (II, 1000, ll. 100-5; 1002, ll. 63-5). The ink stayed wet for hours (I, 563, 571, 162).

But, there is no indication that Gessler had ever heard of Brunell, or of a flame heater when he drew his claims, or until the flame heater was developed by others so as to use the cheaper low vapor pressure petroleum solvents (I, 551). Conde Nast Press put in presses with flame heaters in 1937 (I, 152, 154, 156). The W. F. Hall Printing Company added their flame

heaters in 1937 (I, 551, 564). R. R. Donnelly & Sons Company put in presses with flame heaters in 1936 (I, 586, 601-6) to use with Levey petroleum inks. Regensteiner Company began in 1939 to use flame heaters for petroleum inks (I, 623, 632). Crowell-Collier Publishing Co. was using presses with flame heaters in 1937 (I, 237, 507). They used, among others, the Levey petroleum inks (I, 237, 504-6).

With the heated drum, the paper is in contact with a segment of the drum surface for as much as two feet (I, 74, 215). Slowing down or stopping the press enlarges the time of contact (I, 79, 192, 722-3). If the drum is very hot, the paper would be damaged when the press slows or stops (I, 206). Super-heated steam at 245° F. (136° C.) can be used in a drum if the paper moves fast enough and the outside of the drum is not that hot (I, 205-6). In the flame type heater, there is a gas burner and the inked side of the paper passes at high speed within about an inch from the tips of the gas flames (I, 93, 550, 617). The instant the press slows, the flame is *automatically* moved away from the paper to a safe distance (I, 92-4). Intense heat can thus be used. One witness said:

> "Those heaters will take most anything out of an ink" (I, 553).

The flame heaters were described as:

> "blasting the sheet with heat" (I, 615).

The temperatures near the tips of the gas flame run from 1500° F. to 1900° F. (815° to 1040° C.) (I, 68, 92, 550-1, 606). The record does not show any measurement of the heat at the paper surface, but with 1700° F. one inch away, it must be high. One

witness estimated it as high as 275° F. (I, 70); another as high as 400° F. (I, 550). The highest temperature Gessler mentions in his patent is 150° C. He there speaks of solvents "highly volatile" at 150° C. (II, 733a, col. 1, ll. 71-75; col. 2, l. 16). In the file wrapper, Gessler's attorneys, in 1935, stated (II, 790):

> "The temperature of the printed material when it passes, for instance, over a heated roller, lies between 100° C. and 150° C., and it is evident that practically instantaneous evaporation of the ink (solvent) takes place . . ."

Again (II, 840) in the file wrapper, in discussing McElroy's patent, Gessler's attorney stated that a temperature of 500° F. (260° C.)

> "is much higher than that which could be used in the successful operation of applicant's process."

At page 890 in the file wrapper Gessler's attorney stated:

> "To accomplish the results obtained by applicant's ink, no solvent can be equivalent to this solvent (butyl carbitol), if it has a vapor pressure substantially higher than 0.06 mm. at 20° C., for in this case the ink would dry on the press, or if it has a comparatively low vapor pressure at 150° C., as in this case it could not be vaporized instantly by any heat which can safely be applied to printing matter."

These references show that when Gessler said "approximates" 40 mm., in 1935, he did not know that any solvent with a lower vapor pressure was practicable.

In his testimony, conscious of the weakness of his claim of infringement, he said that his invention included any solvent whose vapor pressure at 150° C.

is "on the order of centimeters" as distinguished from millimeters, and added:

> "Well the order of centimeters runs from one centimeter on up, does it not?" (I, 126).

His claim does not say "one centimeter"; it says approximately 40 mm. (four centimeters). His early claims were as broad as he now contends the allowed claims to be, and covered any solvent with a high enough vapor pressure on application of heat to quickly dry. *Those claims he abandoned* (II, 817-20, 875).

In the argument (pp. 34, 35) we deny his right to recapture the abandoned claims by stretching those he substituted.

The record also justifies the conclusion that in stating the vapor pressure at 150° C., he meant that the vapor pressure of the solvent should be as high as that, and that it was immaterial if it were higher than 40 mm. at 150° C., as long as it was below .02 mm. at ordinary temperature. In claims he submitted in April, 1936, he clearly indicated that (II, 912-915). In a claim, then numbered 56, he said (II, 914):

> "*a sufficiently high* vapor pressure at 100° C. to permit rapid drying" by application of heat (Italics ours.)

Specification of Errors.

The Circuit Court of Appeals erred:

1. In holding that Gessler made an invention and that his ink resulted from anything more than the application of ordinary skill in the art.

2. In holding that the petitioner had infringed and in construing the statement in the claims that the solvent must have a vapor pressure at 150° C. which "approximates" 40 mm., to include one having a vapor pressure of only 20 mm. at 150° C., and thus failing to apply Section 4888 R. S., which requires that the invention be clearly and exactly defined.

3. In setting aside the findings of the District Court, despite the established rule that such findings shall not be set aside unless "clearly erroneous".

Summary of Argument.

I. The patent is void for want of invention. Gessler did nothing which required more than ordinary skill in the art. He did not suggest the use of heaters. That was proposed to him by Cray. He did not invent or discover a solvent with the required characteristics. Such solvents had been made by others, and were on the market, and their characteristics were disclosed in trade catalogues.

Asked if he could compound an ink which would stay moist at room temperature and dry instantly on application of heat, Gessler's answer was immediate. It was obvious to one of very ordinary skill that for the liquid portion of the ink a solvent having such characteristics should be used. Deciding "how to select" the solvent was not invention. Furthermore, prior patents plainly taught the use of such solvents to make "heat-set" inks.

II. There was no infringement. The claims are not broad enough to cover petitioner's ink. The

claims includes only inks with a solvent having a vapor pressure at 150° C. which "approximates" 40 millimeters. At that temperature petitioner's ink solvent has a vapor pressure of only 20 mm. The record plainly shows that Gessler did not know that a solvent with so low a vapor pressure could be used. To construe the claims to mean that 20 mm. "approximates" 40 mm. is to disregard R. S. Sec. 4888, which requires the claims to clearly state the limits of the invention.

III. The findings of the District Court were not "clearly erroneous". On the contrary, they were supported by the clear weight of evidence. They should not have been overturned by the Court below.

ARGUMENT.

I.

The patent is void for want of invention. It discloses only the application of ordinary skill in the art.

This Court has steadfastly adhered to the rule that to be valid, a patent must be supported by the exercise of invention and not merely the skill of the calling. *Cuno Engineering Corp.* v. *Automatic Devices Corp.*, 314 U. S. 84, 90, 91; *Altoona Publix Theatres Inc.* v. *American Tri-Ergon Corp.*, 294 U. S. 477, 486; *Atlantic Works* v. *Brady*, 107 U. S. 192, 200; *Hotchkiss* v. *Greenwood*, 11 How. 264, 267.

This case is controlled by the rule expressed in the cases cited.

It has been said:

> "Our inquiry, therefore, must be addressed to the question of whether the combination is novel

> and whether it passes the line sometimes tenuous and difficult of ascertainment which separates mechanical skill from invention." *Concrete Appliances Co.* v. *Gomery*, 269 U. S. 177, 180.

Here the question is not a difficult one. The answer is found in the patentee's own testimony.

It must be borne in mind that the use of fast rotary presses to print on non-absorbent paper, printing both sides and folding, in one operation without delay, requires two elements, *i. e.*, a heating device on the press, and an ink which stays wet on the inking rollers and type, but dries instantly on application of heat.

This patent is only for the ink, not for the method, and the question is whether the composition of such an ink required of a chemist more than the ordinary skill in his art. Gessler did not suggest the heater. Cray did that. Nor did Gessler invent or discover a solvent with the required characteristics. He found one advertised in the catalogue of a chemical manufacturer, with the necessary characteristics there disclosed. Later, when he wanted another solvent, he went to the Mellon Institute for it. This narrows him down to his own statement that it was invention to *discover how to select* the solvent ingredient.

Given the statement by Cray that a heater could be used on the press, and asked for an ink which would not dry on the type but would dry instantly on being heated, did it require invention or only ordinary skill for Gessler to reach the conclusion that the major liquid component, the solvent, should not dry at room temperature, but should dry instantly when heated? Gessler's testimony answers that question.

When asked by Cray whether such an ink could be supplied, he instantly answered in the affirmative. We

think of an invention as at least requiring some reflection. Gessler needed none. Between 1930, when Gessler had compounded his odorless ink containing butyl carbitol, such reflection as he had given to the matter of producing an ink which would stay moist on the type and dry on the print had been directed to producing an ink whose inherent qualities, without change in temperature, would cause it to act in that way. That he could not do. When the temperature change by use of a heater was suggested, that, as he said, was the "key" to the problem. The production of a heat-set ink was simple. He knew instantly of a suitable solvent. He had used it for his odorless ink. Any competent chemist would have known, or ought to have known, that the liquid component of such an ink must be one which will not evaporate at room temperature, but will evaporate when heated, and then have proceeded to select such a solvent from among known substances. He would not even have needed the teachings of prior patents and publications, which do teach that such an ink can be made by selection of the characteristic solvent.

The prior patents and publications are described at pages 12-15 of this brief. They show "heat-set" inks and the choice of certain solvents to produce them. In one, the Doughty patent, the solvent had a vapor pressure as low as .02 mm. at ordinary temperatures, and 60 mm. at 150° C., precisely like Gessler's butyl carbitol (I, 307-8, 321; II, 961, 1099; III, Exs. E-1, D-1). Doughty's patent was laid aside by the Court below mainly because he applied heat to the type instead of to the print. Lefferts disclosed heat drying inks, using oil of cassia as a solvent, which has vapor pressure as low as .02 mm. at ordinary temperature, and 40 mm. at 150° C. (I, 282, 321-2; II,

957; III. Exs. P, Q). This patent was laid aside by the Circuit Court of Appeals for alleged failure of the petitioner to prove that oil of cassia in 1888 was the same as the oil of cassia of 1942, although one witness said it is the natural essence of a plant and is accepted as being the same (I, 332, 336). The finding of the District Court on this point should have been taken as conclusive.

Neither the alleged satisfaction of a "long-felt want" nor commercial success of heat-set inks can be used to support respondent's claim to invention. Satisfaction of a "long-felt want" is important only if there is a recognized need which became articulate and for a time remained unsolved.

As the Court said in *Toledo Pressed Steel Co.* v. *Standard Parts, Inc.*, 307 U. S. 350, 356:

> "As evidence in its favor on the question of invention, plaintiff cites efforts to find something useful to protect open-flame torches from extinguishment by wind or rain put forth by one engaged in operation of a street railway and by another employed by a manufacturer of lanterns. But it does not appear that either was familiar with the relevant prior art. Nor is there any evidence of general widespread effort to solve the problem here involved. There is nothing that tends to raise what patentees did to the realm of invention."

In *Paramount Publix Corp.* v. *American Tri-Ergon Corp.*, 294 U. S. 464, 476, it was said:

> "Thus there is no basis shown by this record for the contention that advance in this phase of the motion picture industry was awaiting the de-

velopment of the combined sound and picture record upon a single positive film. On the contrary, the inference seems plain that the advance awaited the public acceptance of the sound motion picture; that when the public demand became manifest it was still necessary to develop suitable mechanisms, not embraced in the patent, for the reproduction of sound from film. There had long been, ready at hand, knowledge in the photographic art which would enable one skilled in the art to produce the film suitable for use in the new apparatus."

In *Altoona Publix Theatres Inc.* v. *American Tri-Ergon Corp., supra*, in holding Vogt's patent invalid, the Court said (294 U. S., at p. 488):

"* * * the record fails to show that there was any long-felt or generally recognized want in the motion picture industry for the device defined by the flywheel claims, or that the use of sound motion pictures was delayed by the inability of those skilled in the art to add a flywheel to the apparatus in order to give the desired uniformity of motion to linear phonograms. * * * When the need arose for a mechanism suitable to move film records with such speed-constancy as to reproduce the sound successfully, it was forthcoming. Only the skill of the art was required to adapt the flywheel device to familiar types of mechanism to secure the desired result."

Here there is no evidence that any chemist ever failed to produce a "heat-set" ink when asked to do so. There is even no evidence that prior to 1931, when Cray acted, any desire or "need" for the use of new fast rotary presses for magazines had become articulate. Any delay in adapting rotary presses to heat-

set inks cannot be laid to the inability of the ordinary ink compounders to compound a heat-set ink. The record shows, on the contrary, that as soon as the need for such inks was expressed, and as soon as the advantages to be gained thereby justified the large expenditures necessary to convert the presses to the use of such ink by adding heating devices, the inks were forthcoming.

In *Firestone Tire & Rubber Co. v. United States Rubber Co.*, 79 F. (2d) 948, 954, the Court said:

> "Many reasons present themselves to explain delay or failure in adopting a method, however obvious, which, though promising a better or more economical result, must still replace a demonstrated method satisfactory to the industry at its then stage of development. We are unable to say when in respect to Dunlop's engaging in automobile tire manufacture cord fabric came into use. If earlier, it may still have appealed to reasonable business judgment to follow general practice. If later, replacing expensive machinery and retooling of the plant might not lightly have been undertaken, unless advantage of change promised to be immediately and highly compensatory, and even then availability of capital and reasonable expectation of the industry's stability or expansion were important things to consider. It may also well be that mass production of automobile tires had not yet reached such proportions as to make a comparatively minor saving in labor cost the important consideration that it later became."

The facts bearing on commercial success and "long felt want" are related on pages 15-18 hereof. The record shows that commercial success was not the result of Gessler's ink but resulted from the use of

heaters, a suggestion of Cray's, and of the development by others of inks with petroleum solvents having a lower vapor pressure at 150° C. than Gessler thought could be used.

In *Cuno Engineering Corp.* v. *Automatic Devices Corp.*, 314 U. S. 84, 94 (1941), the Court said:

> "The commercially exploited device because of the differences in its structure from that shown by Mead is the more compact and easily operated. Its utility as a lighter to be located on the dash of an automobile, which is said to be the merit of the Mead invention, is obvious. *If the improvements resulting in such utility involved invention, it is not the invention of Mead. If they exhibited only the skill of the art, their success cannot be relied on to establish invention by Mead, who did not show or make them. The case is therefore not one for the application of the doctrine that commercial success or the manifest satisfaction of a felt need will turn the scale in favor of invention.*" (Italics ours.)

II.

Infringement.

In the claims, the solvent is required to have a vapor pressure not over .02 mm. at ordinary temperature, and a vapor pressure at 150° C. which "approximates" 40 mm.

The petitioner's ink has a solvent with a vapor pressure not over .02 mm. at ordinary temperature, but its vapor pressure at 150° C. is only 20 mm.

The question is whether a vapor pressure of 20 mm. approximates 40 mm.

Facts bearing on infringement are given on pages 19-24 hereof.

The respondent advances two arguments, accepted by the Circuit Court of Appeals, which seem plausible at first blush but turn out to be fallacious.

One is that 20 is as close to 40 as is 60; that if we exclude 20, we must also exclude 60, and if that be done we exclude butyl carbitol, which has a vapor pressure of 60 mm. at 150° C., and is a solvent which obviously the patentee intended to be within his stated range.

The other argument is that 20 mm. is so much closer to 40 mm. than it is to .02 mm., that by comparison it can fairly be said to approximate 40 mm.

One fallacy of the first argument is that it erroneously assumes that the patentee, in stating the vapor pressure at 150° C., was giving both a minimum and a maximum. Taking the whole record, it is obvious that the patentee meant that the vapor pressure at 150° C. should be as high as approximately 40 mm. Provided always that the vapor pressure at room temperature is as low as .02 mm., the patentee did not care if the vapor pressure at 150° C. was over 40 mm. (p. 24 hereof).

It is reasonable to ask that the claims be interpreted in the light of the facts known to the patentee when he drew them.

Claims of the scope of those in suit were filed in the Patent Office in September, 1935 (II, 873-7). Originally, butyl carbitol, having a 60 mm. vapor pressure at 150° C., was in Gessler's mind. Later he found the acetate to be preferable for use on glue-glycerine rollers, and its vapor pressure at 150° C. is 40 mm. (I, 124-6). So when required to be specific, he named the lower vapor as his standard. His inter-

est was also to state as low a vapor pressure at 150° C. as would operate, so as to capture all solvents which might thereafter become available.

He did not in 1935 know that solvents with a vapor pressure at 150° C. as low as 20 mm. could be used. Their successful use requires the heat of a flame heater, which he then knew nothing of, and which was later developed to be used with low vapor pressure petroleum solvents.

The drum type heater could not safely be used at the high temperatures required for petroleum solvents (pp. 21-22 hereof).

Furthermore, his declarations in the files of the Patent Office (p. 23 hereof) show he did not think a heat as high as that of the flame heater could be used.

In short, if 20 be now said to approximate 40, it is giving to the claims a scope and meaning which the patentee himself did not intend them to have when he wrote them. The record plainly shows that if Gessler's claims have captured inks with solvents as non-volatile at 150° C. as water is at ordinary temperature (20° C.) Gessler has found himself the possessor of a monopoly with a scope far beyond his conception when he drafted his claims.

Gessler, in his testimony, stated that his invention covers any solvent whose vapor pressure at 150° C. "is on the order of centimeters" which he states is from one centimeter up. He wants approximately 40 mm. to be stretched to include 10 mm. The difficulty is that his claim does not state that it includes solvents with a 10 or a 20 mm. vapor pressure at 150°. He once had claims broad enough to cover such solvents, but abandoned them, and should not be al-

lowed to recapture them. *Exhibit Supply Co.* v. *Ace Patents Corp.*, 315 U. S. 126, 136.

If he did intend to cover such solvents as petitioner's, he was laying a trap for the unwary. The main purpose of Sec. 4888 is to save people from becoming unintentional infringers. *United Carbon Co.* v. *Binney & Smith*, 317 U. S. 228, 236.

The statute requires the invention and its limits to be *clearly* defined.

On this record the claim fails to clearly include the accused ink. On the contrary, a fair interpretation is the other way.

III.

The findings of the District Court were not clearly erroneous.

The established rule is that findings of a trial court may not be set aside on appeal unless "clearly erroneous". That is the modern equity rule.

Silver King Coalition Mines Co. v. *Silver King Consol. Mining Co.*, 204 Fed. 166;
Warren v. *Keep*, 155 U. S. 265;
Furrer v. *Ferris*, 145 U. S. 132;
Tilghman v. *Proctor*, 125 U. S. 136, 149;
Kimberly v. *Arms*, 129 U. S. 512, 524;
Davis v. *Schwartz*, 155 U. S. 631;
Adamson v. *Gilliland*, 242 U. S. 350, 353.

The rule has been written into the Federal Rules of Civil Procedure [Rule 52(a)]. Surely, more than lip service should be paid to this rule.

We think the clear weight of the evidence is against invention and infringement. Surely on this record it may not be said that the trial Court's findings to that effect are "clearly erroneous".

In a recent case (*Goodyear Tire & Rubber Co. v. Ray-O-Vac Co.*, 321 U. S. 275) on a question of invention, the Court felt impelled to sustain the patent in deference to the concurrent findings of the two lower Courts.

Here, the findings of the District Court and the Circuit Court of Appeals conflict, and the Circuit Court of Appeals should have felt bound to sustain the trial Court's findings, as there is ample evidence to support them. We think the learned Judges of the Circuit Court of Appeals failed to give any real weight to the findings of the District Court, and in passing on the case *de novo*, as they seem to have done, reached conclusions which a careful scrutiny of the record does not support.

Respectfully submitted.

WILLIAM D. MITCHELL,
WALTER H. FREE,
MARK N. DONOHUE,
Counsel for Petitioner.

FILE COPY

Office - Supreme Court, U. S.
NOV 28, 1944
CHARLES ELMORE CROPLEY
CLERK

IN THE

Supreme Court of the United States

OCTOBER TERM, 1944.

No. 656.

SINCLAIR & CARROLL COMPANY, INC.,
Petitioner,

v.

INTERCHEMICAL CORPORATION,
Respondent.

BRIEF IN OPPOSITION TO PETITION FOR WRIT OF CERTIORARI.

ROBERT W. BYERLY,
Counsel for Respondent.

RALPH M. WATSON,
Of Counsel.

Pandick Press, Inc., 22 Thames St., New York 6, N. Y. U. S. A.

INDEX.

	PAGE
STATEMENT	2
The Patented Ink	2
The Claims of the Patent	4
Infringement	7
Prior Patents and Publication	8
Proceedings	9
District Court	9
On Appeal	9
REPLY TO PETITIONER'S ARGUMENTS	11
I. Petitioner's argument against invention ignores the evidence proving that the prior art failed to indicate *how to select* the solvent required to make the new ink, and erroneously attributes to apparatus long available the change in the art made by the new ink	12
II. Petitioner's argument as to the claims is based on an asserted difference in the drying temperatures of the patented and infringing inks which does not exist in fact	15
III. The opinion of the Circuit Court of Appeals shows compliance with Rule 52(a)	17
NO GROUND FOR CERTIORARI	18
The Petition raises only questions of fact and gives no reason for asking this Court to assume the burden of reviewing the record other than such public interest as is inherent in every patent infringement suit	18

Table of Cases.

	PAGE
Altoona Publix Theatres, Inc. v. *American Tri-Ergon Corp.*, 294 U. S. 477	11
Cuno Engineering Corp. v. *Automatic Devices Corp.*, 314 U. S. 84	11
Diamond Rubber Co. v. *Consolidated Rubber Tire Co.*, 220 U. S. 428	11
General Electric Co. v. *Wabash Co.*, 304 U. S. 364, 371, 372	4, 7
Goodyear Tire & Rubber Co. v. *Ray-O-Vac Co.*, 321 U. S. 275	11
Holland Furniture Co. v. *Perkins Glue Co.*, 277 U. S. 245, 255, 256	4, 5, 7
Kwik Set v. *Welch Grape Juice Co.*, 86 F. (2d) 945, 947	5
United Carbon Co. v. *Binney & Smith Co.*, 317 U. S. 228, 234	4, 7

Opinion Below.

Interchemical Corporation v. *Sinclair & Carroll Company, Inc.*, 144 F. (2d) 842 ..... 1, 9, 10, 11

IN THE

Supreme Court of the United States

OCTOBER TERM, 1944.

No. 656

SINCLAIR & CARROLL COMPANY, INC.,
Petitioner,

v.

INTERCHEMICAL CORPORATION,
Respondent.

BRIEF IN OPPOSITION TO PETITION FOR WRIT OF CERTIORARI.

The opinion below is reported at 144 F. (2d) 842.

The Petition asks this Court to review a unanimous decision of the Circuit Court of Appeals for the Second Circuit sustaining a patent for a printing ink which "involved a highly important step in the art" and "satisfied a long felt want" and "was not the product of a pedestrian worker in a laboratory but of a chemist of imagination who was able to conceive of and employ a solvent that had" "apparently inconsistent attributes" (144 F. (2d) 847). This decision is attacked by assertions in direct conflict with facts stated in the court's opinion and established by the record. A restatement of the case is necessary to correct the inaccuracies and omissions in the statement on pages 1 to 15 of the Petition.

STATEMENT.

The Patented Ink.

The patented ink is used in ordinary printing—relief printing from raised type and raised dots[1]—and the statements which follow relate to such printing:

Most printing is still done by means of linseed oil inks which take several hours to dry (I, p. 227), but the patented ink has replaced linseed oil inks in particular fields where high-grade printing is done at high speed.

High-speed rotary printing presses, like those used today, were in general use for at least thirty years before 1932[2]. They were used solely for printing on soft, absorbent paper, like newspaper[3]. They could not be used for high-grade printing on smooth paper because there was no printing ink which could be instantly dried[4]. Attempts to do high-grade printing on high-speed presses began at least as early as 1917 and were all failures up to 1932[5].

In May 1932, the printing ink made by the patentee, Gessler, and described in the specific example of the patent was demonstrated on a commercial high-speed press[6]. After this demonstration, the new ink was duplicated by several of those to whom it had been disclosed, sometimes with the same materials used in the specific example of the patent and sometimes with cheaper materials having the same

---

[1] Sometimes termed "typographic printing" or "letter-press printing" to distinguish it from the printing from engravings known as "rotogravure" which has been done on high-speed presses provided with heaters since long before the patented ink was invented (I, p. 97).

[2] Use in 1916-1917, I, p. 148. Forty-year old press, I, p. 605.

[3] I, pp. 361, 601.

[4] I, p. 587, Q. 24, p. 625, Q. 28; pp. 110, 148, 531-532, 562-563.

[5] I, pp. 149-153, p. 615, XQ. 47, II, p. 990.

[6] I, pp. 71-80.

physical properties.[7] The use of the ink spread rapidly until by 1935 it was in use by many high-grade illustrated magazines of wide circulation.[8]

The ink so used stems directly from Gessler's first ink. No one before 1932 was able to produce an ink for printing on smooth paper on high-speed presses, and since that date no one has produced such an ink without information derived from Gessler's disclosure.[9]

Before 1932, it was believed to be impossible to select an ink solvent which would produce a quick-drying ink for high-speed presses. Such an ink must travel in a thin film over a long series of ink rollers without drying enough to change its consistency at all,[10] and must be instantly dried on the paper at a temperature which will not scorch the paper. An article published shortly before Gessler's invention pointed out that such an ink could be made if there were a solvent which was non-volatile at room temperature and boiled off[11] at the temperature to which paper may safely be heated, and that there was no such solvent in existence.[12]

---

[7] I, pp. 164-167, 170-173; 176-177, 185-194, 216-218; pp. 76, 78-83, 86, 88, 100-101, 136-137, 640-641; pp. 84-87.

[8] I, pp. 87-88, 113, 701, 713-715; pp. 588-590, 598-601, 640-641; pp. 147, 151-156; pp. 235-238, 634-637.

[9] See citations in footnote 7 above, and I, pp. 97, 99; 396-397, 400-401; 363-368, 370, 563-569.

[10] This requirement did not exist in rotogravure printing (I, p. 97, II, p. 1095). This accounts for the fact that high-speed rotogravure printing was possible before the Gessler ink was invented.

[11] See reference to "boiling temperature" in third paragraph of second column on II, p. 990. The solvent was boiled off in the hot stamping of titles on bookbindings (II, p. 964, ll. 84-99; I, pp. 690, 692).

[12] II, p. 990, 2nd col., 2nd, 3rd and 4th paragraphs. The third paragraph beginning "If we could only flatten the curve of a high boiling solvent," etc. dismisses the possibility of finding a solvent which would make the ink work so "flatten" the vapor pressure curve of the solvent means to change its inherent properties. The author

Gessler discovered and disclosed that it *is* possible to produce the desired ink by selection from known solvents. He discovered that instantaneous drying does *not* require a solvent which boils at the temperature to which paper may be heated, but may be obtained by a solvent which has the properties of a volatile liquid like alcohol at this temperature, and that there is a small class of solvents which have this property and also the property of being practically non-volatile at room temperature (See specification of patent in suit, II, pp. 733, 733a).[1]

The Claims of the Patent.

The claims in issue[2] state by way of introduction "A printing ink which is substantially non-drying at ordinary temperatures and dries instantly on heating of the printed matter"; but, unlike the claims which this Court has condemned for uncertainty in *Holland Furniture Co.* v. *Perkins Glue Co.*, 277 U. S. 245, *General Electric Co.* v. *Wabash Co.*, 304 U. S. 364, and *United Carbon Co.* v. *Binney & Smith Co.*, 317 U. S. 228, they do *not* attempt to define the scope of the invention by this statement of "the use or function of the product itself".[3]

---

and everyone else knew that this was impossible. His statement is just like saying, "If we could only raise the freezing point of water, we could skate all summer".

After dismissing the possibility of using an existing solvent, the author suggested in the fourth paragraph a complicated research in an effort "to get the effect by indirect means". This research came to nothing for Dr. Gessler showed how to obtain the desired effect by direct means, that is, by selecting the right class of existing solvents.

[1] Vapor pressure of typical volatile liquid referred to on last line of first column of II, p. 733a, 4 cm., is far below the vapor pressure of 76 cm. (30 inches) of all liquids when boiling (I, p. 27; see also I, p. 708).

[2] Claims 3, 10, 11, 12, 13 (II, pp. 733b-c).

[3] 277 U. S. p. 256.

The scope of the claims is definitely limited to Gessler's discovery. He pointed out that the long desired ink could be made by selecting a known solvent from a small class having special and peculiar physical properties. The claims define this characteristic ingredient of the ink by the physical property referred to in the specification. They give the range of "vapor pressure" of the solvent, stating limits at two different temperatures. They thus define the new product in precisely the manner in which this Court has stated that such a product should be defined:

> "One was to describe the product by *describing its characteristic ingredient with particularity.* * * * he did this by indicating *the range of water absorptivity*, or stated in another way the degeneration, of the starch ingredient in Perkins' glue. * * * The glue made of this ingredient *within the specified range was a new product.* * * * As such it was entitled to the protection of a patent" (*Holland Furniture Co.* v. *Perkins Glue Co.*, 277 U. S. 245, 255).

In defining the vapor pressure range of the solvent ingredient, the patent claims avoid the use of artificial or arbitrary limits which could not correspond to the physical phenomenon which the patentee had discovered:[1]

(1) The low temperature limit requires a solvent with a vapor pressure as low as that which the illustrative

[1] "A patentee may not arbitrarily select a point in a progressive change and maintain a patent monopoly for all operations in that progressive change falling on one particular side of that arbitrarily selected point. It is only where the selected point corresponds with the physical phenomenon and the patentee has discovered the point at which that physical phenomenon occurs that the maintenance of a patent monopoly is admissible. A claim must be based on invention. The claim to invention depends here upon an alleged discovery of certain limits or points which do not exist in fact and there is therefore no invention." (*Kwik Set.* v. *Welch Grape Juice Co.*, 86 F. (2d) 945, 947.)

solvent has at low temperature. This limit is so definite that it might appear arbitrary, but the proof shows that it corresponds to Gessler's discovery.[1]

(2) The high temperature limit requires that the solvent, when raised to a temperature of 150°C., have a vapor pressure which "approximates that of ethyl alcohol at ordinary temperatures". This limit corresponds to Gessler's discovery that instantaneous ink drying required, not boiling away of the solvent, but merely that

> "at elevated temperatures,[2] this solvent becomes a highly volatile liquid like such highly volatile liquids as, for example, ethyl alcohol" (Specification of Gessler patent, p. 2, col. 1, ll. 72-75, II, p. 733a).

While alcohol (v. p. 4 cm.) is a typical highly volatile solvent, there are many others. Two others, butyl acetate (v. p. 1.5 cm.) and toluol (v. p. 2 cm.) were demonstrated at the trial. The court tests proved that both butyl acetate and toluol have substantially the same volatility as alcohol (I, pp. 662-666). Thus, the highly volatile solvents of which alcohol is typical, have vapor pressures which approximate

---

[1] The low temperature vapor pressure of the illustrative solvent, diethylene glycol monobutyl ether, or butyl carbitol, is the limit stated in the claims. Solvents having vapor pressures slightly above the limit include butyl cellosolve, carbitol and terpineol. Inks made with butyl carbitol are successfully used without any drying on the rollers (I, pp. 71, 75, 78, 81, 113, 132, 199-200, 210, 212, 229-230, 234, 706-707). Inks made with butyl cellosolve and carbitol dry on the rollers of the press (I, p. 707). The terpineol ink of the McElroy patent demonstrated on a press by petitioner proved to have had two-thirds of its terpineol replaced by a solvent having a lower vapor pressure (I, pp. 537, 668, II, p. 757).

[2] The elevated temperatures referred to are from 100° C. to 150° C., and the table in the specification shows that at such temperatures the vapor pressure of the solvent rose from just below 1 cm. to 6 cm., that is, it varied a few centimeters *each way* from the vapor pressure of alcohol (4 cm.) which it equals at 140° C. (I, p. 32).

that of alcohol within a few centimeters,[1] so that the expression used in the claims is not an artificial limit but accurately defines to one skilled in the art one of the essential qualities of an ingredient of the ink disclosed in the specification.[2]

Infringement.

Petitioner's ink was made long after the patented ink had gone into extensive use,[3] was based on the Gessler disclosure, acts just like the patented ink on a high-speed printing press,[4] and contains a solvent whose vapor pressure range is within the limits specified in the Gessler claims. Its vapor pressure is within the low temperature limit

---

[1] The use of the word "approximates" to cover this small range and thus make the claim commensurate with the invention under the physical facts presented in no way resembles the situation considered by this Court in *United Carbon Co.* v. *Binney & Smith Co.*, 317 U. S. 228, where the novelty claimed was in the size of the particles of the final product, and the patentee sought to cover large and small particles whose diameters differed in the ratio of 25 to 1 (317 U. S. 234).

[2] The claim is thus more definite than is required by the decisions of this Court. It does not use "terms of effect or result", although this Court has recently held the use of such terms permissible:

> "A limited use of terms of effect or result, which accurately define the essential qualities of a product to one skilled in the art, may in some instances be permissible and even desirable * * *." (*General Electric Co.* v. *Wabash Co.*, 304 U. S. 364, 371.)

This language apparently referred to an effect or result of the complete product rather than to a description of an ingredient of the product such as is referred to in the Holland Glue case *supra*, for this Court added:

> "but a charactertistic essential to novelty may not be distinguished from the old art solely by its tendency to remedy the problems in the art met by the patent". (304 U. S. pp. 371-372.)

The Gessler claims would not contravene this statement, even if they were construed to define the high temperature vapor pressure limit of the solvent in "terms of effect or result", for the volatility of the solvent at 150° C. is only *one* of the *two* "apparently inconsistent attributes" (II, p. 1103) of this ingredient required to make the ink which remedied the problems in the art.

[3] I, pp. 513-515, 531-532.

[4] I, pp. 237-238; pp. 32-40, 51.

stated in the claims,[1] and at the high temperature mentioned in the claims (150° C.) it has a vapor pressure of 2 cm. which is equal to that of the liquid, toluol, which has the same volatility as the typical highly volatile liquid, alcohol,[2] so that it clearly approximates the vapor pressure of alcohol and is within the Gessler patent.

Prior Patents and Publication.

The prior patents relied on by the petitioner consist of (1) a patent issued in 1888 for an ink which would bite into celluloid, (2) two patents issued in the early 1920's for an ink for use in the hot stamping of bookbindings, and (3) a patent for an unsuccessful quick-drying ink totally different from Gessler's. No one of these patents discloses an ink within the claims of the patent in suit or any ink capable of use to obtain high-grade printing on a high-speed press.[3]

The prior publication cited by petitioner directed the art away from the Gessler invention by indicating that the quick-drying ink problem could not be solved by the selection of an existing solvent and suggesting a long research into plastics which led nowhere.[4]

---

[1] I, p. 51.

[2] I, pp. 306, 665-666.

[3] The disclosure of the prior patents and the evidence in regard to these patents is set forth in detail in the opinion of the Circuit Court of Appeals at 144 F. (2d) 844-45; II, pp. 1098, 1099, 1100. The proofs supporting the Court's statements are found at the following points in the record:

Lefferts patent: I, pp. 327-328, 330, 332, 660-662, 682;
Doughty and McElroy patents: I, pp. 309-310, 517, 534-537, 558, 571, 656, 658-659, 668, 689-695, 709-710;
Jirousek patent: I, pp. 359-361; 670.

[4] See footnote 12 on page 3 *ante*.

None of the prior art told how to select a solvent for compounding an ink which would not dry on the rollers of a press and could be dried instantly on the paper. None of the prior art anticipated or even "foreshadowed" Gessler's invention.

Proceedings.

District Court: The case was tried on January 18, 19, 20, 21, 22, 25, 26 and 27, 1943 before Judge Symes of Denver, sitting by special designation in the District Court for the Southern District of New York. Four months after the trial, the district judge handed down a long opinion (50 Fed. Sup. 881; II, pp. 1024-1047) containing inconsistent[1] statements some of which were in direct conflict with the testimony,[2] and accompanied this with so-called findings of fact (II, pp. 1048-1049) which were not discussed in the opinion nor based on the record, but were mere brief summaries of defendant's arguments. One finding, that as to non-infringement, was directly contrary to a ruling made by the district judge after a full argument during the trial.[3]

On appeal, the Circuit Court of Appeals for the Second Circuit (Judges Clark, Augustus Hand and Swan) recognized that the so-called findings of the district court were clearly erroneous, made a thorough study of the record,

---

[1] For example, the statement of the "status of the art when the invention in question appeared" in the second paragraph on II, p. 1026, contradicts the statement of the prior art in the first paragraph on II, p. 1040.

[2] The statements as to the prior patents (II, pp. 1034-1038) relate only to the general statements in the patents as to problems which were unsolved and are contradicted by the specific disclosures of the patents and the proofs in regard to them which were considered in detail by the Circuit Court of Appeals, 144 F. (2d) 844-45, and are cited in footnote 3 on page 8.

[3] I, pp. 239-244.

pointed out the errors in the district court's findings, and found facts which require a holding of validity and infringement under all relevant decisions of this Court:

The opinion of the Circuit Court of Appeals (144 F. (2d) 842; II, pp. 1094-1104) shows the care with which the Court studied the record: It recites only facts directly supported by testimony and refers to passages in the record which were not cited in the brief of either party.

The opinion points out in detail that the record shows the district court's findings as to the prior patents to be clearly erroneous (144 F. (2d) 844-45; II, pp. 1097-1100), and by a detailed discussion of the evidence on the matter of infringement shows the clear error in the district court's finding on that matter (144 F. (2d) 846-47; II, pp. 1101-1103).

From its thorough consideration of the record, the Circuit Court of Appeals for the Second Circuit found:

(1) That the printing ink of the Gessler patent in suit "involved a highly important step in the art" and "satisfied a long felt want" (144 F. (2d) 847; II, p. 1103), and "the record clearly establishes that the trade had long striven to secure an ink that would maintain its consistency on the rollers until the web was imprinted and would then instantly dry on application of a sufficient amount of heat but had never succeeded in obtaining such an ink until Gessler made his invention" (144 F. (2d) 843; II, p. 1096).

(2) That the making of the patented printing ink "involved more than ordinary talent" and "was not the product of a pedestrian worker in a laboratory but of a chemist of imagination who was able to conceive of and employ a solvent that had the apparently inconsistent attributes" required to make the desired ink, and that the

patent defined a class of solvents which could be used (144 F. (2d) 847; II, p. 1103).

(3) That petitioner's infringing ink "was undoubtedly compounded with Gessler's teaching in view" and contains the solvent defined in the claims of the patent (144 F. (2d) 847; II, p. 1103).

Petitioner cites no decision of this Court holding that in this state of facts a patent should not be held valid and infringed,[1] and we confidently assert that there is no such decision.

REPLY TO PETITIONER'S ARGUMENTS.

The Petition attacks the decision of the Circuit Court of Appeals on the basis of assertions which are directly contrary to the fact findings of that court. Thus, where the court found that the Gessler ink "involved more than ordinary talent" and was the product of "a chemist of imagination" (144 F. (2d) 847), the petitioner asserts that it required "only ordinary skill of a very low order" (p. 9). Where the court found that the record showed that the invention "satisfied a long felt want" which the

---

[1] In *Cuno Engineering Corp.* v. *Automatic Devices Corp.*, 314 U. S. 84, this Court dealt with a mechanical gadget which involved no more skill "than that to be expected of a mechanic skilled in the art". This would correspond to "the product of a pedestrian worker in a laboratory" and is wholly different from an invention which required "a chemist of imagination who was able to conceive of and employ a solvent that had apparently inconsistent attributes".

In *Altoona Publix Theatres, Inc.* v. *American Tri-Ergon Corp.*, 294 U. S. 477, there was involved neither "imagination" on the part of the alleged inventor nor the satisfaction of a "long felt want".

The facts found by the Circuit Court of Appeals are similar to those passed on by this Court in *Goodyear Tire & Rubber Co.* v. *Ray-O-Vac Co.*, 321 U. S. 275, *Diamond Rubber Co.* v. *Consolidated Rubber Tire Co.*, 220 U. S. 428, and other cases where patents have been sustained.

prior art could not fill (144 F. (2d) 843, 847), the petitioner asserts that "the record here fails to show that there was any long felt or generally recognized want" (p. 21).

The arguments by which the petitioner supports its three points are based on erroneous statements which run all through the portions of the Petition entitled "STATEMENT" and "FACTS" (pp. 1-4, 6-15). They are not supported by the record and, for the most part, not even by the so-called fact findings of the district court whose decision was reversed. They can be met by showing their inconsistency with the proofs in the record and, insofar as is possible within the confines of this brief, we shall direct attention to the proofs which refute them.

Petitioner's Point I.

Petitioner's assertion that Gessler's ink "at best requires only a low order of skill" (p. 19) is based principally on three statements in conflict with the record.

1. The repeated assertion that all Gessler did was to "compound" an ink of known materials of known properties is misleading in that it omits the fact that the so-called "compounding" was based on discovering and disclosing *how to select* the principal ingredient of the compound—a vital point on which the prior art gave no information (*ante*, p. 8).[1]

2. The second erroneous statement used to attack the decision of the Circuit Court of Appeals on validity relates

[1] Petitioner's discussion of the prior patents (pp. 9, 10, 11) contains fragmentary quotations from the patents and ignores the facts considered by the Circuit Court of Appeals in its discussion of the prior patents (144 F. (2d) 844-845; II, pp. 1098, 1099). These facts (which are established by the record, *ante*, p. 8) show the error in petitioner's assertion that two of the prior patents disclose inks within the claims of the Gessler patent.

to the use of heaters on printing presses. Petitioner cannot ignore the great advance made in magazine printing on introduction of the Gessler ink, but seeks to attribute this advance, not to the ink, but to the heating devices by which the ink is dried. The Petition contains the naive statement "no one *seems* to have provided the fast presses with heating devices to instantly dry the ink after printing so as to permit use of such presses on non-absorbent paper" (p. 7). The record shows definitely that there was no ink useable on fast printing presses which could be dried instantly by heat (*ante*, p. 3). Naturally, therefore, presses were not provided with heaters for this purpose.

But heat had some effect in helping the drying of ordinary linseed oil ink and was useful for some other purposes,[2] and as a result heaters both of the gas flame type and roller type were used on printing presses long before the Gessler ink appeared.[3] There was no difficulty whatever in using the old devices to dry the new Gessler ink.[4]

No one other than petitioner's witness, Kerley, attributed the success of the ink to the development of some particular heating device. He referred to some heater made in 1937 as essential (I, p. 551), although the ink had been in successful use at the plant of the Curtis Publishing Company since 1934 (I, pp. 88, 102). Kerley's statements as to heating ovens are on a par with his statement that none of the inks made under the Gessler patent and com-

---

[2] See footnote 1 on page 2.

[3] Gas heaters: I, p. 162. II, pp. 998-1012.
Hot rollers: I, p. 97, II, pp 993-997, 1013-1015.

[4] The first press on which the ink was demonstrated had a cooling roller. It was necessary only to run steam instead of cooling liquid through this roller. As the use of the Gessler ink spread, heaters were improved and "refined" but remained essentially of the old types, gas heaters and steam-heated rollers (I, p. 94). See also: I, pp. 79-80, 192-193; 68-70, 606, 617.

mercially used for years were successful until he himself had made a similar ink (I, p. 550, see pp. 563-566).

3. The third erroneous statement relied on in the argument against validity is that not Gessler but a Mr. Cray made the invention of the patent. By ignoring the proof showing that heating devices had long been used on printing presses, the petitioner can assert that the information which Mr. Cray gave Gessler as to this feature of the prior art was the real basis of the invention. This assertion cannot be reconciled with the fact that Cray himself, in spite of all his familiarity with ink-making and with the use of heaters, had never been able to make a quick-drying ink for high-speed presses until after he had obtained Gessler's ink (I, p. 99).

The manner in which Dr. Gessler made the invention is clearly described in his own testimony (I, pp. 707-709), which is supported by the notebook which he kept at the time (I, pp. 701-706). The Petition contains no justification for the slur which it seeks to cast upon this testimony of a distinguished chemist whose probity was not attacked or questioned at the trial.

When it is recognized that Gessler did not merely compound an ink but discovered and disclosed how to select the principal ingredient which created an ink whose novelty and value were at once recognized by printers, that heating devices had long been used on presses and were immediately available to dry the new ink, and that the information which Gessler received from Cray was merely as to the prior art, petitioner's assertion that the creation of the patented ink required merely a low order of skill is seen to be directly at variance with the record.

Petitioner's Point II.

We have pointed out above that the claims of the Gessler patent fully comply with this Court's decisions as to the definiteness required in claims (*ante*, pp. 4-6).

Petitioner argues that the claims are rendered indefinite by construing them to cover petitioner's ink. This argument is based on an asserted difference between petitioner's ink and the patented ink which does not in fact exist:

1. Petitioner compares petitioner's ink solvent with water and argues that, since this solvent has the same vapor pressure as water, and water does not evaporate as quickly as alcohol, the vapor pressure of the solvent cannot approximate that of alcohol.

The supposed analogy to water on which this argument is based was exploded at the trial. Petitioner's expert made a court test in which alcohol evaporated more rapidly than water (I, pp. 317-318), and said that this demonstrated a difference in volatility at elevated temperatures between the solvent of the patented ink and that of petitioner's ink (I, p. 318). When the expert's attention was called on cross-examination to the fact that the moisture in the air of the room delayed the evaporation of water, he suggested toluol as a liquid having the same vapor pressure as water and not present in the air of the room (I, pp. 373-374). The volatilities of toluol and alcohol were then demonstrated in court and it was shown that there was no appreciable difference between them (I, pp. 665-666), plainly showing that the water analogy is false, and that petitioner's solvent has at 150° C. the vapor pressure of a solvent as volatile as alcohol, and thus approximates the vapor pressure of that typical volatile liquid.

2. The Petition repeatedly asserts that petitioner's ink does not, like the patented ink, dry instantly at the temperature to which paper may safely be heated (150° C.) but requires a heat of 1700° F. (900° C.). This statement is contrary not only to the record but also to the laws of nature:

The vapor pressure and rate of evaporation of an ink solvent depend upon its temperature. When a thin film of ink has been printed on paper, the temperature of the ink and the paper are necessarily substantially the same. When this temperature exceeds 150° C. the paper is scorched.

To raise the ink and paper from room temperature to a higher temperature, it is necessary to apply heat to them.

There are two generally used commercial methods for heating the ink and paper:

(1) One is to pass the web of paper around a roller or steam drum heated to the temperature to which the ink and paper are to be heated. Sufficient heat is transferred from the hot roller to the paper in contact with it to heat the paper and ink to substantially the same temperature as the roller while the web is passing around the roller.

(2) The other method is to pass the ink and paper close to a gas burner in a gas-heated furnace. In this case, the heat is transferred to the ink and paper, not from hot metal, but from hot gas. In order to raise the temperature of the paper and ink to 150° C. while the web is passing through the furnace, it is necessary that the gas be at a temperature far above 150° C. (I, pp. 68, 70). If paper were raised to the temperature of the gas, it would burn. This is plain from the use of safety devices on such furnaces to extinguish the gas immediately if the web slows down or stops (I, pp. 93-94).

If the statement in the Petition to the effect that a heat of 1700° F. is necessary to dry petitioner's ink quickly were true, the ink would be wholly useless, as it could not be dried quickly without burning up the paper on which it is printed.[1]

The statement in the Petition to the effect that a heat of 1700° F. is necessary to dry petitioner's ink quickly is directly contrary to the record. The testimony of petitioner's witness, Kerley, at I, pp. 550-551, is the only authority for this statement cited in the Petition (p. 4, p. 24). The witness referred to 1700-1900° F. as the heat of the *flame* in the burners. But in the same answer, the witness admitted that the traveling web does not reach anywhere near this temperature.

Actually, petitioner's ink, like that described in the patent, dries instantly at 150° C. This is conclusively proved by demonstrations in court (I, pp. 32-40, 51) and by commercial use of the ink on the same press on which the patented ink had been used (I, pp. 237-238).

When it is recognized that the analogy between the evaporation rate of water and of petitioner's solvent is false, and that there is no practical or observable difference between petitioner's ink and the ink of the patent, it is evident that the decision of infringement was correct and that it did not render the claims indefinite.

Petitioner's Point III.

The Circuit Court of Appeals for the Second Circuit fully complied with Rule 52(a). Its opinion pointed out in detail that the so-called findings of fact of the district court were clearly erroneous (*ante*, p. 10).

---

[1] See colloquy between court and petitioner's vice-president on I, p. 530.

NO GROUND FOR CERTIORARI.

The opinion of the Circuit Court of Appeals for the Second Circuit sets out clearly the facts which led that court to sustain the Gessler patent. In sustaining the patent under the facts found, the court followed the decisions of this Court dealing with similar sets of facts, and violated no rule of law established by this Court in any patent case.

The Petition raises no question of law but is an attempt to induce this Court to consider the fact and expert evidence in the record and to review the conclusions of fact unanimously reached by three judges of an able court which has carefully considered this evidence.

The Petition states no recognized reason for asking this Court to assume this burden. The allegations of public interest under "Reasons for Granting the Writ" on page 16 of the Petition are obviously such as could be made by any defendant in any patent case. Charges of "monopolistic tribute" are particularly inapposite in the present case, for (a) the use of the patented ink in printing magazines sold to the public at popular prices shows that the respondent has made the benefits and economies of the Gessler invention available to the public, and (b) the competition of high-speed rotogravure printing with the high-speed typographic printing done by means of the patented ink (evidenced by the concurrent use of both in printing *Collier's*[1]) excludes respondent from any monopolistic position in magazine printing.

It is, of course, true that the public interest is involved to a certain extent in every patent infringement suit (as in many other sorts of private litigation). In general, errors in sustaining patents injure the public by the grant of unau-

[1] I, pp. 235-238, 634-637.

thorized exclusive rights, while errors in invalidating patents legalize the stealing of real inventions and injure the public by reducing the inducement to invent and introduce new inventions upon which progress of the useful arts depends.

In spite of this inherent public interest in all patent litigation, Congress has not granted a right of appeal to this Court in patent cases, and this Court has not, in its rules, specified errors in sustaining or invalidating patents as a ground on which the discretionary power of *certiorari* will be exercised. Some special or unusual circumstance is necessary to justify placing on this Court the burden of reviewing the evidence in a patent case, and no such circumstance exists or is alleged in the Petition in the present case.

Respectfully submitted,

ROBERT W. BYERLY,
Counsel for Respondent.

RALPH M. WATSON,
of Counsel.

FILE COPY

Office - Supreme Court, U. S.
FILED
MAR 28 1945
CHARLES ELMORE CROPLEY
CLERK

IN THE

Supreme Court of the United States

OCTOBER TERM, 1944

No. 656

SINCLAIR & CARROLL COMPANY, INC.,

Petitioner,

v.

INTERCHEMICAL CORPORATION,

Respondent.

ON WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SECOND CIRCUIT.

BRIEF FOR RESPONDENT

ROBERT W. BYERLY,
RALPH M. WATSON,
Counsel for Respondent.

SUBJECT-MATTER INDEX.

	PAGE
SUMMARY OF ARGUMENT	iii
OPINIONS BELOW	1
JURISDICTION	1
QUESTIONS PRESENTED	1
STATEMENT OF FACTS	2
I. Before the Gessler Disclosure	2
Printing Ink	2
Printing Machinery	3
Heat Drying in Printing Industry	4
II. The Gessler Disclosure	9
The Claims of the Patent	14
III. The Effect of the Gessler Disclosure	18
IV. The Facts Bearing on Infringement	23
V. Prior Patents and Publication	27
Jirousek Patent	27
Lefferts Patent	28
Doughty Patent	29
Hanson Article	32
ARGUMENT	35
On Validity	35
On Infringement	40
Petitioner's New Contention	41
Petitioner's Technical Argument	48
Conclusion	52

Table of Cases.

	PAGE
Atlantic Works v. *Brady*, 107 U. S. 192	39
Badische Anilin & Soda Fabrik v. *Kalle*, 94 Fed. 163, aff. 104 Fed. 802	32
The Barbed Wire Patent, 143 U. S. 275	35
B. B. Chemical Co. v. *Cataract Chemical Co.*, 122 F. (2d) 526	37, 39
Carnegie v. *Cambria*, 185 U. S. 403	36
Cuno Corp. v. *Automatic Devices Corp.*, 314 U. S. 84	36
Densmore v. *Scofield*, 102 U. S. 375	36
Dewey & Almy Chemical Co. v. *Mimex Co.*, 124 F. (2d) 986	31
Diamond Rubber Co. v. *Consolidated Tire Co.*, 220 U. S. 428	35
Dow Chemical Co. v. *Halliburton Oil Well Cementing Co.*, U. S. S. C., decided March 5, 1945	15, 39
E. I. duPont deNemours & Co v. *Glidden Co.*, 67 F. (2d) 392	39
Expanded Metal Co. v. *Bradford*, 214 U. S. 366	35
Goodyear Tire & Rubber Co. v. *Ray-O-Vac Co.*, 321 U. S. 275	31, 35, 39, 41
Hartford-Empire Co. et al v. *United States*, U. S. S. C., decided January 8, 1945	39
Holland Furniture Co. v. *Perkins Glue Co.*, 277 U. S. 245	15, 38
Krementz v. *S. Cottle Co.*, 148 U. S. 556	35
Kwik Set v. *Welch Grape Juice Co.*, 86 F. (2d) 945	15
Lake Shore &c. R. Co. v. *Car-Brake Shoe Co.*, 110 U. S. 229	51
Loom Company v. *Higgins*, 105 U. S. 580	35
Picard v. *United Aircraft Corp.*, 128 F. (2d) 632	35
Smith v. *Snow*, 294 U. S. 1	52
Towne v. *Eisner*, 245 U. S. 418	49
United Carbon Co. v. *Binney & Smith Co.*, 317 U. S. 228	17

SUMMARY OF ARGUMENT.

The printing ink of the Gessler patent in suit possesses both of two desired qualities which had previously been obtained only separately in different inks for different presses. It travels over a series of distributing rollers of an ordinary printing press without drying or changing its consistency, just as did the wholly non-volatilizable inks previously used on such presses. It can be dried instantly on the paper at the moderate temperature to which paper may safely be heated, just as were the highly volatile inks previously of use only on special presses having no distributing rollers.

Gessler discovered the exact point or degree of volatility required in the liquid part of a printing ink for the phenomenon of stability on the distributing rolls of a printing press, and the degree or range of volatility required for the phenomenon of instantaneous drying of ink printed on paper. He disclosed that the volatility points required for these two antagonistic phenomena were such as could be obtained by a moderate change in temperature in a single solvent, if the solvent were in the small class which exhibits a remarkably quick increase in volatility on heating above room temperature. Thus, he disclosed two things not previously known: (1) that an ink having the antagonistic properties required for high-quality printing on high-speed presses could be made from known materials, and (2) the range of the physical property determining volatility required in the liquid ingredient of such an ink.

The ink having a liquid ingredient *within the specified range* was a new product:

> "The glue made of this ingredient *within the specified range* was a new product. * * * As such it was entitled to the protection of a patent". (*Holland Furniture Co.* v. *Perkins Glue Co.*, 277 U. S. 245, 255).

In a very recent case, this Court has again recognized patentable invention in the discovery of a "definite point or range" "corresponding to a physical phenomenon" (*Dow Chemical Co.* v. *Halliburton Oil Well Cementing Co.*, decided March 5, 1945).[1]

Gessler's disclosure of how to make an ink having the two antagonistic properties required for high-speed high-quality printing was made to the Patent Office by the filing of his application in 1932. In the same year, it was made to the printing industry by demonstrating the operation of the ink described in the application on a high-speed press, and furnishing it to others who analyzed it and determined the volatility properties of its solvent.

The value of the disclosure is attested by the proofs. Before the disclosure, no one had made an ink which could be used for high-quality printing on high-speed presses. After the disclosure, no one made such an ink without access to the disclosure. Those to whom the disclosure was made had no difficulty in making such an ink. Some made it with the identical solvent of the first Gessler ink. Others made it with a cheaper solvent having the same volatility properties.

The first imitators to use a cheaper solvent pretended to have thought of the invention before the Gessler ink was demonstrated to them, and a long litigation in the Patent Office was necessary to dispose of this claim.

The present litigation was brought to stop the infringement of a late-comer. Petitioner made no quick-drying ink

---

[1] The patent there in question could not be sustained on the ground that a "definite dilution point or range is discovered corresponding to a physical phenomenon", since the patent itself negatived any such discovery by stating that concentrations *outside* the specified range could be used. The specification and claims of the Gessler patent are limited to the range which Gessler discovered to correspond to the physical phenomena.

until after the value of the Gessler invention had been established and printers had, on the strength of respondent's demonstrations of the ink, invested in rotary presses to enable them to take advantage of the antagonistic properties of the ink which made fine printing on such presses possible. Then petitioner merely duplicated one of respondent's commercial inks made under the patent, and sold it to respondent's customers.

The District Court held the patent anticipated by prior patents disclosing inks for other purposes. The Circuit Court of Appeals, after a careful examination of the record, ascertained that no one of these patents described an ink whose solvent ingredient was within the range specified in the Gessler patent nor any ink which could be used for doing high-grade printing on high-speed presses. It sustained the patent, and held it infringed by petitioner.

In attacking this decision, petitioner refuses to recognize the nature of the disclosure on which the Gessler patent is based and endeavors to explain away its results. Petitioner's various suggested explanations of why high-grade printing on high-speed presses had not been done before Gessler's disclosure (Pet. Br., p. 18) are unconvincing. They contain a ten-fold exaggeration of the cost of a heater for drying the new ink, and ignore the proof that printers were glad to incur the expense of heaters, as well as the much larger expense of obtaining additional rotary printing presses, as soon as they learned of the new ink which made possible high-grade printing on such presses. Petitioner also ignores the long-felt want for such an ink as to which the opinions of the two lower courts contain concurrent findings.

In this Court, petitioner has attempted, for the first time, to make its purely technical argument against

infringement appear substantial. The exigencies of the case have forced the petitioner into the contention that the slight difference between its ink and the specific ink described in the patent is of some practical importance. Its claim that its ink required a different heater to dry it was not presented to or passed on by either court below and has no basis in fact.

Since petitioner's brief presents this new and unsound view of the fact situation and ignores the facts on which the Circuit Court of Appeals based its decision, we shall review the facts in some detail to make it entirely clear that:

(1) An ink made from a solvent ingredient within the range specified in the Gessler patent was a new product which is patentable under this Court's decisions in *Holland Furniture Co.* v. *Perkins Glue Co.*, 277 U. S. 245, and *Dow Chemical Co.* v. *Halliburton Oil Well Cementing Co.*, decided March 5, 1945.

(2) This new ink eliminated the difficulties caused by the slow drying of linseed-oil inks which had long plagued the printing art, and made possible for the first time the use of high-speed rotary presses for doing high-grade printing on smooth paper, so that it is clearly patentable under this Court's decisions in *Loom Company* v. *Higgins*, 105 U. S. 580, 589, 591, and the other cases relied on in the majority opinion in *Goodyear Tire & Rubber Co., Inc.* v. *Ray-O-Vac Co.*, 321 U. S. 275.

(3) The actual proven effect of Gessler's disclosure was to make an important "step in advance in the useful art" of printing, so that it forms a valid consideration for patent rights and is clearly patentable under this Court's decision in *Atlantic Works* v. *Brady*, 107 U. S. 192, 200, relied on in the dissenting opinion in *Goodyear Tire & Rubber Co., Inc.* v. *Ray-O-Vac Co.*, 321 U. S. 275.

(4) Petitioner copied respondent's commercial ink made in accordance with the claims of the patent so as to obtain the full benefit of the Gessler disclosure without having contributed anything to the making or the introduction of quick-drying ink, and is clearly an infringer under this Court's decisions in *Goodyear Tire & Rubber Co., Inc.*, v. *Ray-O-Vac Co.*, 321 U. S. 275, 278, and *Smith* v. *Snow*, 294 U. S. 1, 14.

A rotogravure press used an entirely different kind of ink from an ordinary printing press. The printing cylinder dipped directly in a tank or trough of ink which filled the recesses in the plate and was then wiped off the rest of the surface of the cylinder. The ink used was a thin liquid consisting mainly of a thin volatile oil. This could be used because the ink is not passed over a series of distributing rollers. The paper on which the ink was printed was heated by a steam drum or a blast of hot air. This dried the ink very rapidly without injuring the paper, as the volatile oil in the ink boiled at a low temperature.

There was one other special type of printing in which a volatilizable ink had been dried by heat. This was the hot stamping of metallic inks on bookbindings. It was done on small stamping presses in which the type or die was maintained at a high temperature by an electric heater.[3] The inks were less volatile than those used in rotogravure printing, but the type was kept at the boiling point of the liquid in the ink and so dried the ink as it was being applied.[4] The temperature of the die was very much hotter than the temperatu e to which paper may be raised without scorching.[5]

The rapid drying obtained by heat in these special processes naturally suggested the use of similar methods in ordinary printing, so as to make newspaper presses available for doing high quality printing:

The owner of the patents on the hot-stamping inks who had a large printing establishment tried to use them in ordi-

---

[3] I, pp. 690-691.

[4] II, p. 964, ll. 84-99; I, pp. 350, 691.

[5] See II, p. 840.

printing on the other side. In printing on soft absorbent paper such as newspaper, the rotary web press could be used notwithstanding the fact that the second side of each part of the web is printed only a few seconds after the first side has been printed. This was done without smudging only because the ink printed on the first side of the web was absorbed into the soft paper.[1]

The slow hardening of linseed-oil inks had made it impossible to use rotary presses for high-grade illustrated magazines which must be printed on smooth and non-absorbent paper.[2] It thus precluded the obvious saving of time and space which would have been achieved by the use of such presses in magazine printing. The economies which could be made by hastening the drying of printing ink have been apparent during forty years or more[3] during which high-speed roller presses have been available for printing newspapers.

Heat is the most obvious way of hastening the drying of anything. This has been part of the knowledge of the human race ever since our first caveman ancestor got wet in a shower and then lay out in the hot sun to dry. "Drying", in this sense, means evaporation, and applies only to liquids which are volatilizable, that is, capable of being evaporated.

Hastening drying by applying heat to a volatilizable liquid is an expedient which had long been used in the printing industry. Its most important use had been in the special type of printing known as rotogravure or intaglio, which is, in a sense, the opposite from ordinary printing. The ink is deposited on the paper from engraved recesses or pockets instead of from raised type and raised dots.[4]

---

[1] Admitted in Pet. Br., pp. 7, 8.
[2] I, p. 587, Q 24; pp. 600-602; p. 625, Q 28.
[3] I, pp. 148, 605, 627.
[4] Rotogravure printing is described at I, pp. 97, 157-158, 501, 556, 602-603, 616-617, 629-630, 635-636.

If in passing over the distributing rolls, an ink changes its consistency, the work of the skilled ink-maker who originally compounded it is lost, the consistency of the ink on the type is wrong, and good printing cannot be obtained.[3] To avoid all danger of such a change, it had long been customary to use as the liquid part of a printing ink an oil which is non-volatilizable.[4] The oil ordinarily used was linseed oil which is incapable of any evaporation.[5] Ink made with this oil necessarily has the same consistency when it reaches the type as it did when it started its journey across the distributing rollers. It, therefore, prints perfectly if given the correct consistency in the first place.

The linseed oil in an ordinary printing ink of course remains non-volatile after the ink has reached the paper. It has, however, the capacity of slowly absorbing oxygen from the air and undergoing a chemical alteration which changes it from a liquid into a solid.[6] This hardening, or drying as it is sometimes inaccurately called, takes anywhere from one hour to twenty-four hours.[7]

Printing machinery reached a highly developed stage many years ago. Printing presses include the flat bed type which prints on one side of a sheet of paper and the rotary web type which prints first on one side and then on the other side of a rapidly traveling continuous web of paper. In doing high quality printing on smooth paper, it had been necessary to use the flat bed type and to wait from one to twenty-four hours after printing on one side of the sheets before inserting them in the press again and

---

[3] I, pp. 31, 70.

[4] I, pp. 65-66, 110, 148, 585.

[5] I, p. 216.

[6] I, p. 358.

[7] I, pp. 148, 152, 162, 214, 592, 626.

STATEMENT OF FACTS.

I. BEFORE THE GESSLER DISCLOSURE.

The Gessler patent in suit describes a printing ink which may be dried instantly by heat applied to the paper on which it is printed. To understand the disclosure of the patent and its significance; it is necessary to have some knowledge of printing ink, printing machinery, and the use of heat-drying in the printing industry before Gessler's disclosure was made.

Printing ink, unlike writing ink, is a thick substance like paste so that it may stand on raised type and the raised points and lines of cuts and be transferred to paper pressed against them. The thickness or consistency of the ink is of great importance in obtaining good printing. There has grown up a whole profession of ink-makers who are skilled in the art of mixing printing ink ingredients so as to obtain just the best consistency to work on particular papers and on particular printing presses. To apply a modern term to a very old art, this is the "know how" of the business of manufacturing printing ink.[1]

In order to use a thick ink such as a printing ink, it is necessary to spread it out in a very even, thin film on the face of the type and on each of the minute raised dots on the plates from which pictures are printed. This is done by passing the ink over a long series of rollers which have various different motions and distribute the ink and spread it out more and more evenly and thinly until at the last roller the film is in just the right condition to be applied to the type or plates.[2]

---

[1] I, pp. 65-67, 219-220, 531-532.

[2] I, pp. 29-31, 67-69, 636; II, p. 743.

IN THE

Supreme Court of the United States

OCTOBER TERM, 1944.

No. 656.

SINCLAIR & CARROLL COMPANY, INC.,
Petitioner,

v.

INTERCHEMICAL CORPORATION,
Respondent.

ON WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SECOND CIRCUIT.

BRIEF FOR RESPONDENT.

Opinions Below.

Opinion of District Court, 50 F. Supp. 881.
Opinion of Circuit Court of Appeals, 144 F. (2d) 842.

Jurisdiction.

The judgment of the Circuit Court of Appeals was entered August 28, 1944. The writ of certiorari was granted December 11, 1944. Jurisdiction rests on Section 240(a) of the Judicial Code, as amended by the Act of February 13, 1925 (U. S. C., Title 28, Sec. 347).

Questions Presented.

Is Gessler Patent No. 2,087,190 for a printing ink valid?
Is the patent infringed by petitioner's ink?

nary printing but found they would not work except when applied with a hot die.[1] His experience was confirmed by that of petitioner's expert who tried to demonstrate that the hot-stamping ink could be used in ordinary printing, but found it necessary to make a complete change in the formula of the ink in order to do even passable printing.[1]

Rotogravure inks were altogether too thin and volatile to be passed over the distributing rollers of ordinary presses printing from type,[2] but the success of heat drying in rotogravure led to various attempts to use heat to hasten ink drying in ordinary printing, and apparatus for this purpose was developed long ago:

> A British patent of 1925 shows the provision of a steam-heated drum such as was commonly used on rotogravure presses[3] to heat the printed paper in an ordinary printing press.[4]
>
> An American patent applied for in 1924 described a pressure gas heater for heating the printed paper in a printing press.[5] The pressure burners projected flame and "intense" heat on the printed paper, but, owing to the rapid movement of the paper, the flame did not heat the paper to a temperature which scorched it.[6] The apparatus contained the arrangements necessary to turn off the heat when the paper stopped so as to avoid danger of burning the paper.[7]

---

[1] See proofs discussed in connection with Doughty patent, *infra*, pp. 29-30.

[2] I, pp. 636-637.

[3] I, p. 97.

[4] II, pp. 1013-1015.

[5] Brunell patent No. 1,592,806, II, p. 998.

[6] II, p. 1002, ll. 54-70.

[7] II, p. 1001, ll. 91-98.

These heating devices, while effective in heating the printed matter, were not widely used before the Gessler invention. Contrary to the hopes of those who designed these heaters, it was found that heat had only a slight effect on the chemical hardening or crystallization of the linseed oil used in printing inks for ordinary printing.[4]

An unsuccessful effort which also involved the use of heat was made by a man named Jirousek in about 1930. The formula of his first inks is not disclosed, but, according to the testimony and his patent applied for in 1932, his idea was to add a little volatile liquid and wax to linseed-oil ink.[5] His ink attained some initial success for use on flat bed presses where it reduced somewhat the length of the time which it was necessary to wait before printing on the second side of the paper.[6] In an advertisement, he said that his ink would dry in one hour.[7] This is, of course, not nearly fast enough to permit printing on smooth paper in a rotary press where there is a lapse of only a few seconds between printing on the two sides of the paper, and the ink proved unsuccessful on such a press.[8] The advertisement is, however, interesting in showing the demand for a printing ink which would dry quickly, and the fact that in those days an ink which dried in one hour was considered a quick-drying ink.

Other attempts to do high-quality printing on rotary presses are described by the District Court in its opinion:

> "Many experiments were tried to make it possible to immediately print the second side. A traveling

---

[4] II, p. 1000, ll. 100-105; I, pp. 162, 216.

[5] I, pp. 442-43, 450, 495, 670, 699; II, p. 983.

[6] I, pp. 416, 419, 429, 433-434, 467-468, 490, 493, 495, 499-500.

[7] Ex. Q-1.

[8] I, pp. 696-700.

blotter was used which traveled along behind the paper, and then was rolled up on a different roll. This not only did not prevent smudge entirely, but took a good deal of the wet ink off the paper, so the final copy was light; that is, did not have ink enough on it. [Such attempts ran from 1917 to 1930, I, pp. 149-53; p. 615, XQ. 47.]

"Therefore the art attempted to make the ink dry faster by causing the drying oil to absorb oxygen faster. This by heating and blowing ozone on it. That is, after the sheet came out from the type, and before the second side was printed, it was passed over a steam roller or device which warmed the paper. At the same time ozone was blown on it—ozone being a very active form of oxygen—which was absorbed by the oil faster than it would be if it was just quietly exposed to the air. [I, p. 79; II, p. 990, 1st par.]

"This method did not prove commercially successful. Shooting ozone on the paper was a difficult and dangerous thing to do in a printing plant, although it did make the drying oils oxidize more rapidly than they had before. *That seems to have been the status of the art when the invention in question appeared.*" (II, pp. 1025-1026).

In this finding the Circuit Court of Appeals concurred:

"It was at first sought to correct this difficulty by running a separate web of 'treated manila' through the press underneath the web of the paper that had been printed for the purpose of protecting the wet ink on the first side at the time when the second impression was being made. There were various other attempts to prevent smudging when linseed oil was used in the ink and at the same time to maintain a high speed in printing, but it remained impossible to print on smooth paper in a high speed press until an ink was discovered that would dry instantly when the proper time arrived." (II, p. 1095).

And from these undisputed facts the court drew the inevitable conclusion that there was "a long felt want" for such an ink (II, p. 1103).

II. THE GESSLER DISCLOSURE.

The Gessler patent described the long desired ink. It disclosed that the ink could be made of known materials and gave the information necessary for selecting the principal ingredient of the ink so that all those skilled in the art could make it.

To understand the patent, it is necessary to know the meaning of the scientific term "vapor pressure" which provides a quantitative measure of the volatility of a liquid.

Vapor pressure is a molecular pressure existing within a liquid and tending to force its molecules out through its surface, or, in other words, tending to cause the liquid to change into a gas or evaporate. Except in the case of water, whose evaporation is delayed by the normal presence of water vapor in the atmosphere[1], the amount of the vapor pressure of a liquid indicates the rate at which it will evaporate.

The vapor pressure of any one liquid increases as the temperature of the liquid is increased. In order to specify the inherent vapor pressure characteristic of some particular liquid, it is, therefore, necessary to specify its vapor pressure at some particular temperature, or better, at a number of different temperatures.

---

[1] I, pp. 371, 666.

Vapor pressure is ordinarily expressed quantitatively in the same units as barometric pressure. It is measured by the linear height of a column of mercury which will balance the pressure.

Certain relations between vapor pressure and rate of evaporation are well recognized:

> When the vapor pressure of a liquid is zero, there is no evaporation.[2]
>
> When the vapor pressure of a liquid is 30 inches, that is, equal to atmospheric pressure, the liquid is actively boiling.[3]
>
> Ordinary volatile liquids, such as alcohol and toluol, which must be kept tightly corked to avoid loss, have vapor pressures of one or two inches at room temperature.[4]
>
> Some evaporation occurs even in a liquid whose vapor pressure is very low.[5]

With this measure of volatility in mind, we may state specifically the requisites of an ink for use in printing on smooth paper in a high-speed rotary press, as envisaged by those skilled in the art:

(1) At room temperature, the ink must be non-volatile so as to maintain its consistency in its long travel over the distributing rollers. A vapor pressure of zero at room temperature would accomplish this. This requirement was so impressed on those skilled in the art that no one had suggested for regular printing operations the use of any

---

[2] I, pp. 52, 321.

[3] I, pp. 27-28.

[4] Alcohol has v. p. of 4 cm. or 1.6 in. Toluol has v. p. of 2 cm. or 0.8 in. (I, pp. 662-665).

[5] I, p. 47.

ink whose liquid component contained more than a minor proportion of any liquid whose vapor pressure was not zero.[6]

(2) At a temperature to which paper may be raised without scorching it, the ink must dry in the few seconds available between first and second side printing. This would be accomplished by the use in the ink of a liquid having a vapor pressure of 30 inches at 150°C. so that the liquid would boil away instantaneously. The firmness with which this requirement was fixed in minds of those skilled in the art is apparent from (a) the use in rotogravure printing of oils boiling at very low temperatures, (b) the boiling off of the solvent by a hot die in the hot-stamping method, and (c) an express reference to the need of a vapor pressure of 30 inches in an article published before the Gessler invention was disclosed.[7]

It was thus apparent that the desired ink could be made by the use of a solvent having a vapor pressure of zero at room temperature and a vapor pressure of 30 inches at 150°C. The only difficulty in compounding such an ink arose from the fact that there was not and is not any solvent having these two properties.

How Dr. Gessler overcame this difficulty appears from the specification of his patent (II, p. 733):

The specification begins by stating the object of the invention—to create a new type of printing ink that does away with the disadvantages associated with ordinary printing inks. The disadvantages arising from the slow

---

[6] The ink of the Jirousek patent had 20% of a volatilizable liquid (I, pp. 359-360, 670; II, p. 760). The other prior art cited does not describe any ink for regular printing containing any such liquid.

[7] II, p 990, second column, third paragraph. See pp. 32-34, *infra*.

drying of the linseed oil used in ordinary printing ink are then pointed out in some detail.[1]

The existence of the disadvantages referred to is fully confirmed by the proofs. The statement that the drying of prints made with ordinary inks takes many hours or even days[2] accords with the experience of practical printers[3]; the "dependency of the printing process upon the time required to obtain a complete drying"[4] was a serious disadvantage in magazine printing in requiring early closing dates[5] ;and the use of extra paper to prevent smudging[6] is described in attempts to print on smooth paper in high-speed presses[7].

The specification next refers to the proposed use of ordinary lacquers as printing inks. Reference is made to the high volatility of lacquer solvents, and it is stated that inks made from them dry on the plates or rollers of the press and, therefore, cannot print well.[8]

Dr. Gessler then says that he has discovered that this difficulty may be avoided by using "solvents with high boiling points".[9] This discovery was out of line with the experience of the printing art, for a high boiling solvent is not a non-volatilizable liquid like linseed oil whose vapor pressure is zero at all temperatures.[10] But the disclosure was not merely that the vapor pressure of the ink on the distributing rollers may be something greater than zero,

[1] II, p. 733, 1st col.
[2] II, p. 733, col. 1, ll. 32-33.
[3] I, pp. 99, 148, 151, 555, 592, 626.
[4] II, p. 733, col. 1, ll. 24-26.
[5] I, p. 624.
[6] II, p. 733, col. 1, ll. 37-40.
[7] I, pp. 148-150.
[8] II, p. 733, col. 1, l. 41 to col. 2, l. 2.
[9] II, p. 733, col. 2, ll. 3-6.
[10] I, pp. 52, 216.

which would have been of little help. It was specific. It named an illustrative high boiling solvent, diethylene glycol monobutyl ether,[1] and said that with an ink made with this solvent

> "the printing operation may be carried out *in the ordinary manner* and at ordinary temperatures" (II, p. 733a, col. 2, ll. 17-19).

This discloses to the printer that an ink made with a solvent whose vapor pressure is as low as that of the illustrative solvent at room temperature may be passed over the distributing rollers without changing its consistency.

This was a disclosure of great value, for it showed that a volatilizable liquid with a room-temperature vapor pressure as low as about one one-thousandth of an inch[2] could be used instead of linseed oil. Petitioner learned the importance of this discovery when it attempted to use ink containing a solvent with vapor pressure a little bit higher than this and found that it did not work.[3]

The specification contains another disclosure equally valuable and more startling. In referring to the same illustrative solvent, Dr. Gessler said:

> "When heated to *about 100° C. or above*, the rate of vaporization is greatly accelerated and, when used in the ink of this invention, produces *a print which dries almost instantaneously* when subjected to such a heat treatment" (II, p. 733a, col. 1, ll. 4-9).

From a table in the specification, it appears that the heating "to about 100° C. or above" specified in the state-

---

[1] II, p. 733, last line.

[2] The illustrative solvent has at room temperature (20°C.) a vapor pressure of 0.02 mm. or 0.0008 in., or about one one-thousandth of an inch (II, p. 733a, col. 1, l. 68).

[3] See p. 30, *infra*.

ment quoted brings the vapor pressure of the illustrative solvent up from below one one-thousandth of an inch to something between a quarter of an inch (at 100°)[2] and two and a third inches (at 150°)[2], or roughly, to a vapor pressure of about an inch or two. This is the vapor pressure which ordinary volatile liquids, such as alcohol, have at room temperature, but everyone knows that when a bottle of alcohol is uncorked the alcohol does not boil or disappear instantaneously. Instantaneous evaporation ordinarily means boiling. Boiling means a vapor pressure of *thirty* inches.

But, in the statement quoted, Gessler disclosed the surprising fact that not *thirty* inches but only *one or two* inches of vapor pressure is sufficient for instantaneous drying of the very thin film of ink in a print.

The importance of this surprising disclosure lies in the fact that, while there are no solvents whose vapor pressure is below one one-thousandth of an inch at room temperature and can be brought to thirty inches by a heat which paper will stand, there are a few known solvents whose vapor pressure can be brought up from this low value to one or two inches by such heating. With such solvents, Dr. Gessler disclosed, an ink can be achieved which does not change its consistency on the rollers of a press and which may be instantly dried on the paper. *What had been considered impossible was shown to be simple to achieve.*

The Claims of the Patent.

The scope of the claims is definitely limited to Gessler's discovery. He pointed out that the long desired ink could be made by selecting a known solvent from a small class

[2] 6.4 mm. is 0.25 in. 60 mm. is 2.36 in. (II, p. 733a, col. 1, l. 70).

having special and peculiar physical properties. The claims define this characteristic ingredient of the ink by the physical property referred to in the specification. They give the range of vapor pressure of the solvent, stating limits at two different temperatures. They thus define the new product in precisely the manner in which this Court has stated that such a product should be defined:

> "One was to describe the product by *describing its characteristic ingredient with particularity.* * * * he did this by indicating *the range of water absorptivity*, or stated in another way the degeneration, of the starch ingredient in Perkins' glue. * * * The glue made of this ingredient *within the specified range was a new product.* * * * As such it was entitled to the protection of a patent". (*Holland Furniture Co.* v. *Perkins Glue Co.*, 277 U. S. 245, 255)

In defining the vapor pressure range of the solvent ingredient, the claims avoid the use of artificial or arbitrary limits which could not correspond to the physical phenomenon discovered, in compliance with a decision recently cited with approval by this Court:

> "A patentee may not arbitrarily select a point in a progressive change and maintain a patent monopoly for all operations in that progressive change falling on one particular side of that arbitrarily selected point. It is only where the selected point corresponds with the physical phenomenon and the patentee has discovered the point at which that physical phenomenon occurs that the maintenance of a patent monopoly is admissible." (*Kwik Set* v. *Welch Grape Juice Co.*, 86 F. (2d) 945, 947, cited in this Court's decision in *Dow Chemical Co.* v. *Halliburton Oil Well Cementing Co.*, decided March 5, 1945)

The low temperature limit in the claims requires a solvent whose vapor pressure is "as low as" that which the illustrative solvent has at room temperature. This limit is so definite that it might appear arbitrary, but the proof shows that it corresponds to a physical phenomenon which Gessler discovered, namely, that an ink must have a room-temperature vapor pressure as low as that of the illustrative solvent in order that the ink may pass over the distributing rollers of a press without drying or changing its consistency. It is proved that, while inks made with the illustrative solvent have been and are successfully used without any drying on the distributing rolls[1], inks made with solvents whose room-temperature vapor pressures are slightly above the limit do not operate in this way and are unusable in ordinary printing[2].

The high temperature limit in the claims requires that the solvent, when raised to a temperature of 150° C., have a vapor pressure which "approximates that of ethyl alcohol at ordinary temperatures". This limit corresponds to a physical phenomenon which Dr. Gessler discovered, namely, that instantaneous drying of the thin film of ink in a print required, not 30 inches or 76 centimeters of vapor pressure to boil away the solvent as previously thought necessary, but merely that "at elevated temperatures, this

---

[1] I, pp. 71, 75, 78, 81, 113, 132, 199-200, 210, 212, 229-230, 234, 706-707.

[2] Solvents having vapor pressures at room temperature slightly above the limit specified in the claims and slightly higher than that of the illustrative solvent include *butyl cellosolve*, *carbitol* and *terpineol*. Inks were made with *butyl cellosolve* and *carbitol* by Dr. Gessler before he filed his application and when tested on a press were found to dry on the rollers (I, p. 707).

Terpineol is the solvent used in the ink which was used in the hot stamping of book bindings and is described in the Doughty patent which neither the owner of this patent nor petitioner were able to use in ordinary printing (See *post*, pp. 29-30).

solvent becomes a highly volatile liquid like such highly volatile liquids as, for example, ethyl alcohol".[1] The elevated temperatures referred to are "about 100°C. or above",[2] and the table in the specification[3] shows that between 100°C. and 150°C. the vapor pressure of the illustrative solvent is from just below 1 cm. to 6 cm., a variation of a few centimeters *each way* from the vapor pressure of alcohol, 4 cm.[4]

While alcohol (v. p. 4 cm.) is a typical highly volatile solvent, there are many others. Two others, butyl acetate (v. p. 1.5 cm.) and toluol (v. p. 2 cm.) were demonstrated at the trial. The court tests, although of course not scientifically accurate, were sufficient to show that both butyl acetate and toluol have substantially the same volatility as alcohol (I, pp. 662-666). Thus, the highly volatile solvents of which alcohol is typical, have vapor pressures which approximate that of alcohol within a few centimeters, so that the expression used in the claim is not an artificial limit but accurately defines to one skilled in the art one of the essential qualities of an ingredient of the ink disclosed in the specification.[5]

The proofs make it clear that the high temperature limit of the claims corresponds to the phenomenon of instantaneous drying of the film of ink in a print, for they show that the inks now in extensive use which dry instantly

---

[1] II, p. 733a, col. 1, ll. 72-75.

[2] II, p. 733a, col. 1, l. 5.

[3] II, p. 733a, col. 1, l. 70.

[4] The vapor pressure of the illustrative solvent equals that of the volatile liquid butyl acetate (1.5 cm.) at 115°C., and that of the volatile liquid alcohol (4 cm.) at 140°C. (I, pp. 33-36).

[5] The use of the word "approximates" to cover this small range and thus make the claim commensurate with the invention under the physical facts presented in no way resembles the situation considered by this Court in *United Carbon Co.* v. *Binney & Smith Co.*, 317 U. S. 228, where the novelty claimed was in the size of the particles of the final product, and the patentee sought to cover large and small particles whose diameters differed in the ratio of 25 to 1 (317 U. S. 234).

at a temperature which does not scorch the paper contain solvents whose vapor pressures at 150° C. approximate that of alcohol within a couple of centimeters[1], and no ink for use in ordinary printing which exhibits this phenomenon has been shown to have a vapor pressure outside this range.

III. THE EFFECT OF THE GESSLER DISCLOSURE.

The effect of the disclosure of the Gessler patent on the printing industry is not a matter of speculation. In 1932, Gessler made essentially the same disclosure to the printing industry that is made in the specification of his patent. In May of that year, the specific ink described as an example in his patent was tested on a commercial high-speed typographic printing press provided with means to heat the web of paper after it was printed, and demonstrated that the instantly-drying ink needed for high-speed printing presses had at last been produced. The ink did not dry or change its consistency during its travel over the ink rollers. The ink was dried instantly by heat applied to the paper.[2]

After this demonstration, Dr. Gessler furnished the ink to two small printing ink companies.[3] One of them had the Gessler ink analyzed by a varnish company, duplicated

---

[1] Respondent's commercial inks contain solvents having vapor pressures from 2 cm. to 6 cm. at 150° C. (I, p. 126).

Petitioner's commercial ink has a vapor pressure of 2 cm. at 150° C. (I, pp. 50, 56).

Commercial inks made by the Curtis ink-maker after Gessler's disclosure to Curtis contain solvents having vapor pressures between 2 cm. and 6 cm. at 150° C. (I, pp. 640-641).

[2] I, pp. 71-80.

[3] For convenience, unpigmented inks were furnished so that various pigments could be added to them by the ink companies (I, pp. 81, 130-131, 164, 174).

it and supplied it to a large printing company in Kalamazoo, Michigan, where it was seen by employees of the respondent who were much astonished, as they had never before seen a typographic ink which could be dried instantly.[1] They obtained samples of the inks which were analyzed by the respondent.[2]

The other ink company sold the Gessler ink to the Curtis Publishing Company, who for years had been trying many expedients to overcome the delays caused by the slow drying of linseed-oil inks. On hearing of the first demonstration of the ink, they requested a demonstration at their plant. After obtaining a statement of what the ink contained and using it for about a year, the Curtis Company had the ink made from a cheaper material[3] by their own ink-maker and have used this ever since to enable them to print the *Saturday Evening Post* on high-speed presses.[4] Mr. Cray also made the ink from a cheaper material and demonstrated it to respondent.

Respondent's president met Dr. Gessler and learned that the two instantly-drying inks of different chemical compositions which respondent had found in widely different parts of the country were both derived directly from an ink which Dr. Gessler had originated. Unlike other ink manufacturers, respondent gave full credit to Dr. Gessler, purchased his patent application, made him head of its laboratory, manufactured his quick-drying ink, and sold it under the name of "Vaporin".[5]

By a mere demonstration of what the ink would do, respondent was able to have it adopted by the printers of many high-grade magazines of large circulation including

---

[1] I, pp. 176-77, 216-17.

[2] I, pp. 164-167, 170-173, 176-177, 185-194, 216-218.

[3] The details of the making of this copy of the Gessler ink are discussed under the head of Infringement (*infra*, p. 23).

[4] I, pp. 76, 78-83, 86, 88, 100-101, 136-137, 640-641.

[5] I, pp. 87-88, 113, 701, 713-715.

Life, *Collier's* and *The New Yorker*. The reaction of magazine printers to the new ink is the clearest proof of the long-felt want for such an ink:

One of them, who had been in the printing business for twenty-four years, said that the demand for an ink which could be dried immediately after printing had existed as long as he had been in the business. (I, p. 627.)

The manager of the largest printing plant in the world (printer of *Life* and *Time*) said:

> "We were very anxious to cooperate with any experiments that could be conducted, because we realized that an ink of this kind, if it could be made to work, would revolutionize letter-press printing. * * *
>
> "Now, the reason for that was that up till then, this time, we had been forced to confine our printing on rotary presses to absorbent stocks, and we had not been able to print on rotary presses and perfect the printing on coated paper without considerable offsetting. * * *
>
> "Now, if this new ink would make it possible for us to print on coated papers, or enamel papers and perfect the sheet and then immediately fold and deliver folded signatures from the press, it would enable us to print a great deal faster than we ever had been able to print on flat bed presses on this kind of papers" (I, pp. 586-88).

When he found that the ink would work, his company invested about a million dollars in rotary presses to utilize the new ink in fast printing on coated papers (I, p. 601).

The manager of the printer of *The New Yorker* said that his company bought a heater for $5,000[1] to try out the new ink,[2] and, when they found that it really dried, in-

[1] Petitioner's brief, p. 18, gives $100,000 as the cost of a single heating device. This is not supported by petitioner's citation, I, p. 571. The investment there mentioned evidently referred to equipping a number of presses with heaters.

[2] I, p. 154.

vested half a million dollars in new rotary presses in order to use it to full advantage.[2] It happens that he himself had had experience in trying to print a magazine on a rotary press long before the Gessler ink was known.[3] He made it plain that the investment in rotary presses would not have been made if the new ink had not been available.[4]

The printer of *Collier's* said:

> "It is because of the introduction of the Vaporin or heat flash inks that the letter press field has been more or less revolutionized" (I, p. 635).

In 1936, the respondent introduced its Vaporin ink at the Hall Printing Company,[5] a large plant in Chicago. This plant continued to buy some Vaporin ink but, for the most part, had its own ink-maker, Mr. Kerley, make a similar ink for them. This he did very easily by purchasing heat-set "varnishes", that is, inks complete except for the addition of pigment.[6] The Hilton-Davis Company, after acting as chemical consultant for the respondent,[7] was selling such heat-set varnishes containing the solvents used by respondent in making its Vaporin ink.[8]

Petitioner later went into the making of heat-set inks at the suggestion of the Hall Company.[9]

Thus, only a few years after Dr. Gessler made and demonstrated the first volatilizable quick-drying ink used in ordinary printing, the use of such an ink became general wherever rapid high-grade printing was required, and

---

[2] I, p. 153.

[3] I, pp. 148-151.

[4] I, p. 153.

[5] I, pp. 545-546, 563-564.

[6] I, pp. 548-550, 565-566. See I, p. 219.

[7] I, p. 370.

[8] I, p. 367; III, Ex. 36.

[9] I, pp. 513-514, 515, 531-532.

the ink so used was based on information derived directly or indirectly from Dr. Gessler's original disclosure. Before Dr. Gessler's disclosure, no one in the printing industry was able to produce an ink for printing on smooth paper in high-speed presses, and since Dr. Gessler's disclosure no one has produced such an ink without information derived from the disclosure.

But, although those in the printing industry who received information from Dr. Gessler's disclosure were quick to make use of it, only respondent gave Dr. Gessler credit.

A long litigation in the Patent Office was necessary to dispose of the claim of the Curtis Publishing Company and their ink-maker that they had thought of the invention before Dr. Gessler's ink was demonstrated to them.[1]

The present litigation was then brought to check the parasitic infringement of an ink manufacturer who had appropriated Dr. Gessler's ink after its merits had been fully established and printers had made investments in rotary presses and heaters to enable them to realize its advantages.

---

[1] After MacGregor of the Curtis Company had witnessed successful use of the Gessler ink on a high-speed printing press (I, pp. 76-80), MacGregor and an employee of the ink-maker, Levey, filed a patent application containing a method claim which was no more than a description of the use of the Gessler ink in the manner in which it was intended to be used (Ex. M-2, p. 33). Gessler adopted the method claim to fight an interference and won (Ex. M-2, pp. 31, 33). The interference was not finished until three years after the issue of the Gessler ink patent here in suit. The Gessler method application was dropped to avoid double patenting and extension of the monopoly.

IV. THE FACTS BEARING ON INFRINGEMENT.

By far the greater part of the instantly-drying ink which has been made and sold for use on high-speed rotary presses since Dr. Gessler's first disclosure differs from the specific example given in the patent by the substitution of a less expensive solvent. But the solvents in these commercial inks resemble the illustrative solvent given in the patent in two vital respects: (1) They all have at room temperature vapor pressures which are as low as the vapor pressure of the illustrative solvent. (2) They all have at an elevated temperature of 150° C. the vapor pressures of highly volatile liquids approximating that of the typical volatile liquid, alcohol, within a couple of centimeters.[1]

The illustrative solvent of the patent which was used in the first Gessler ink was a rather expensive synthetic solvent entirely free from odor. Ink containing this synthetic solvent has continued in successful commercial use up to the present time, in printing where an ink which is both quick-drying and odorless is required.[2]

Where lack of odor was not vital, it was a simple matter to substitute for this synthetic solvent a cheaper solvent having the same vapor pressure characteristics, such as an especially selected "narrow cut" of petroleum:

Petroleum, as it comes from the ground, consists of a mixture of a large number of different chemical compounds called hydrocarbons, having different degrees of volatility, that is to say, having different vapor pressures. They run all the way from compounds which evaporate instantly at

---

[1] I, pp. 126, 640-641.

[2] I, pp. 178-183, 194, 197-199, 210-213, 229-234; Exs. 29, 30.

room temperature to compounds which cannot be evaporated by heating.[4]

The numerous different hydrocarbons in petroleum may be separated by what is known as fractional distillation. In this way, it is customary to divide them into four groups known as gasoline, kerosene, fuel oil, and mineral oil. If the separate hydrocarbons are represented by the cards of a pack, as suggested by petitioner's expert (I, p. 383), this would amount to cutting the deck into four parts, each of which would contain a large number of cards and would be what is called a "wide cut".

"Wide cuts" such as kerosene cannot be used in the Gessler ink for they are mixtures of a large number of different hydrocarbons of different degrees of volatility, some of which evaporate from the distributing rollers and change the consistency of the ink, while others remain in the ink when the paper is heated and prevent the ink from drying (I, pp. 137, 138). Such mixtures are excluded by the claims of the Gessler patent.[5]

It is possible to use fractional distillation to separate out from petroleum only one, or at most only a few, hydrocarbons. In this way, those who wished a cheaper solvent for use in Dr. Gessler's ink took from the wide range of hydrocarbons available in petroleum only those which had the vapor pressure characteristics of the illustrative solvent contained in Dr. Gessler's first ink.

The witness Cray told just how he did this:

---

[4] I, pp. 105-106, 383-384.

[5] The claims in issue specify that "substantially all of the liquid component" of the ink must have a vapor pressure complying with the specified room-temperature limit, and that "the major part of the liquid component" must have a vapor pressure within the specified elevated-temperature range. This excludes kerosene or any wide cut since only a small proportion of the hydrocarbons contained in it have vapor pressures within the specified limits.

He at first tried various petroleum products on the market and found that they would not work. He then took the matter up with a large oil company asking them to provide a petroleum cut with a narrow boiling range like that of Gessler's synthetic solvent.[1] This was a simple but perhaps unscientific way of asking for a liquid containing only a few petroleum hydrocarbons all having about the same degree of volatility, in contrast to the commercial petroleums, like kerosene, which were mixtures of a great number of hydrocarbons of different volatilities.[2] Having obtained narrow cuts from the oil company, Cray made practical tests to check their vapor pressures with that of Gessler's original solvent by comparing the action of inks made with them with inks which he had obtained from Dr. Gessler. He said frankly, "I always used that as a yardstick to check on" (I, p. 85). In this way, he had little difficulty in selecting the particular petroleum hydrocarbons whose vapor pressures were within the limits set up in the Gessler patent.[3]

Many of the Vaporin inks which respondent sold under the Gessler application and patent had solvents consisting of narrow petroleum cuts such as were used by Mr. Cray in imitating the first Gessler ink. The narrow cuts used contain only hydrocarbons within Dr. Gessler's limits. At 150° C. they all have the vapor pressure of volatile liquids, running from 2 cm. to 5 cm. and approximating the 4 cm.

---

[1] I, pp. 84-85.

[2] I, pp. 43, 105, 107, 383-384.

[3] Mr. Cray's description of his work in imitating the original Gessler ink by the use of a cheaper solvent suggests the nature of the work done by the Curtis Company and their ink manufacturer who also imitated Dr. Gessler's ink in this manner. They too first used a petroleum containing some solvent outside the limits specified by Dr. Gessler, but checked with the "yardstick" by running their inks beside Gessler's on the same press and later used narrow cuts containing only petroleum hydrocarbons within Dr. Gessler's limits (I, pp. 82, 101-102, 128-129, 136-137, 640-641).

vapor pressure of the typical volatile liquid, alcohol (I, pp. 113, 126, 127). The slight differences in vapor pressure theoretically affect the drying times of the inks (I, p. 128) but none of the witnesses who testified as to the use of the inks noted any practical difference between them.

Petitioner first went into the making of heat-set inks in 1938.[4] Its ink-makers were unable to make such inks with ordinary petroleum products,[5] but had no difficulty in making them when they obtained a special petroleum cut which had been prepared by an oil company after respondent's Vaporin ink was on the market and had been supplied to the respondent for use in its ink.[6]

The petroleum solvent which the petitioner obtained from this oil company and used in its ink is characterized by petitioner's own petroleum expert as "specially prepared material", a "very narrow cut", a "specially provided fraction" of petroleum (I, p. 196). It contains only three hydrocarbons (I, p. 59). Measurements made by both parties show that these three hydrocarbons have vapor pressures which, while not identical with Dr. Gessler's first solvent, are within the limits specified in the claims of the Gessler patent—at room temperature their vapor pressure is "as low as" that of Gessler's illustrative solvent, and at 150° C. the vapor pressure is 2 cm. which is equal to that of the liquid, toluol, which has the same volatility as the typical highly volatile liquid, alcohol,[7] so that it clearly approximates the vapor pressure of alcohol. There is no observable difference between the operation of petitioner's and respondent's inks. They print and dry in the same way on the same rotary high-speed presses.[8]

---

[4] I, pp. 513-515, 531-532.
[5] I, p. 515.
[6] I, pp. 396-397, 400-401.
[7] I, pp. 306, 665-666.
[8] I, pp. 237-238; see pp. 32-40, 51.

The use of such a specially prepared cut as an ink solvent is not a departure from the Gessler patent, but a very obvious following of the disclosure in that patent. The patent, using a synthetic solvent only as an illustration, specifies definite vapor pressure limits. Reverting to the illustration in which the cards of a pack represent petroleum hydrocarbons of different volatilities, the Gessler patent designated just which two or three of the cards in the pack could be used as a solvent in the new ink. Anyone could then merely separate these cards from the rest of the pack, and use them as an ink solvent. This was a way of following Gessler's disclosure which had been obvious to other ink-makers and had been long used by respondent.

The change made by others in Dr. Gessler's original ink and adopted by the petitioner was a mere following out of Dr. Gessler's disclosure.

V. PRIOR PATENTS AND PUBLICATION.

The proofs as to each prior patent and publication fully support the findings of the Circuit Court of Appeals in regard to them, and show that the District Court's findings as to them are clearly erroneous.

The Jirousek patent (II, p. 983) gives an extremely complicated ink formula which amounts to modifying the linseed-oil ink by the addition of a small proportion of very volatile solvents and a little wax.[1] Jirousek's ink was never used on a high-speed printing press. Before learning of the Gessler invention, respondent spent considerable money testing the Jirousek ink and found it useless.[2] The ink

[1] See cross-examination of petitioner's expert (I, pp. 359-361).

[2] I, pp. 696-701.

described in the Jirousek patent bears no resemblance to the ink described and claimed in the Gessler patent.[3]

The Lefferts patent (II, p. 957) of 1888 discloses the idea of printing on celluloid with an ink containing a solvent for celluloid so that the ink will bite into the material on which it is printed[4].

The solvent of Lefferts' ink was oil of cassia, one of the so-called "essential oils" usually used as perfumes and flavors. It is a natural mixture coming from the interior of China. Part of it is highly volatile as indicated by its strong odor which in itself precludes its use in an ink for ordinary printing (I, pp. 661-662). Its composition and vapor pressure vary from year to year. Thus, oil of cassia purchased in 1939 was found to have a room-temperature vapor pressure much higher than that of butyl carbitol, while oil of cassia purchased in 1942 was found to have a vapor pressure about the same as that of butyl carbitol (I, pp. 660-661). No one who wished to specify a definite limit of volatility or vapor pressure would rely on these natural products of variable volatility. The only definite chemical compound mentioned in the Lefferts patent is

---

[3] One-third of the liquid component of the ink has a room-temperature vapor pressure two hundred times as great as Dr. Gessler's limit (I, p. 670; II, p. 760), so that the ink is clearly not one in which substantially all the liquid component has a vapor pressure as low as the limit specified in the claims.

The major part of the liquid component of the ink, amounting to two-thirds of the liquid, is linseed oil which is non-volatile at all temperatures (I, p. 360; II, p. 760; See I, pp. 162, 216), so that the ink is clearly not one in which the major part of the liquid component has a vapor pressure at 150° C. approximating that of alcohol as specified in the Gessler claims.

[4] Lefferts did not suggest the application of heat to the printed matter to evaporate the solvent in his ink. On the contrary, he definitely stated "no drying will be found necessary, as the ink is of such nature as to rapidly harden on the material employed" (II, p. 959, ll. 9-11). This, as petitioner's expert admitted, is evidently a reference to the penetration of the solvent for celluloid into the celluloid on which the ink is placed (I, p. 330).

nitro-benzole whose vapor pressure at room temperature is far outside the Gessler limit (I, p. 332).

The Doughty patent (II, p. 961) of 1922 relates to inks for application to book bindings by means of a heated die or stamp. The ink which it describes specifically has a solvent, terpineol, whose vapor pressure is greater than that of Gessler's illustrative solvent at room temperature[1] and therefore outside the limit specified in the Gessler claims in issue.

The owner of this patent has used the ink which it describes for many years in the hot stamping of book bindings. Being in the printing business, he recognized the need for a quick-drying ink for ordinary printing and made several attempts to use the ink of this patent for that purpose, but was unsuccessful. It is plain from his entire testimony on pp. 688-696 of Vol. I, that the Doughty ink was good for nothing except hot stamping. It could be used on paper only by first sizing the paper and then applying the ink with a hot die in the same way as it was applied to book bindings (see last four Qs. on I, p. 695).

Petitioner evidently realized that the Doughty patent could not be relied on to anticipate Gessler in making a quick-drying ink for ordinary printing unless the ink which this patent described could be successfully used on an ordinary high-speed printing press; for petitioner introduced evidence of a fairly successful run on a high-speed press at which 18,000 copies were printed with what petitioner's expert called "the Doughty and McElroy[2] ink" (I, p. 309).

---

[1] It is twice the vapor pressure of butyl carbitol on Taylor Ex. I-1 in Vol. III, but published data give it three times as high (I, p. 656; III, Ex. J).

[2] The McElroy patent (II, p. 963) covers a minor improvement in the hot stamping ink of the Doughty patent. It is not mentioned in petitioner's brief to this Court.

The joker in this *ex parte* test developed in the cross-examination of other witnesses for the petitioner. *Terpineol is the solvent in the Doughty and McElroy inks* described in the patents. Doughty's formula contains terpineol alone. McElroy's formula adds *not over 5%* of the much less volatile liquid, rosin oil, as a "plasticizer"[1]. *Rosin oil was the solvent used in petitioner's test ink*—not pure rosin oil, but rosin oil to which a minor proportion of terpineol had been added, presumably to satisfy the conscience of petitioner's expert:

Solvent of Doughty patent:	Solvent of McElroy patent:	Solvent of Petitioner's test ink:
100% terpineol	95% terpineol	66⅔% rosin oil
(II, p. 962, l. 40[2])	5% rosin oil	33⅓% terpineol
	(II, p. 964, ll. 18, 19)	(I, p. 537, II, p. 757)

It is obvious that this radical change in the formula would not have been made if petitioner had been able to make the terpineol ink work successfully.

The change made by the petitioner in order to make its demonstration is conclusive proof that terpineol—the preferred solvent of the Doughty patent and the one actually used in the hot-stamping inks—is too volatile for use in a quick-drying ink for ordinary printing.

The incidental mention of the solvent terpinyl acetate in the Doughty patent is of no significance since the Doughty patent did not address itself to the problem of providing

---

[1] A "plasticizer" is a comparatively non-volatile liquid which is intended not to evaporate with the solvent when the ink is heated but to remain in the dried ink to keep it from being too brittle (McElroy patent II, p. 963, ll. 103-107; Gessler patent II, p. 733a, col. 1, ll. 10-19; see also I, p. 249).

[2] Doughty's alternative solvent, benzyl alcohol, has a room-temperature vapor pressure even higher than that of terpineol (I, p. 347, last Q.).

a quick-drying ink for ordinary printing, but to providing an ink to be applied by a hot stamp. The importance of the difference in the problems to which patents are addressed, which is noted in a late decision of this Court,[1] may be brought out by contrasting the sufficiency of the Doughty patent as a patent for a hot stamping ink and its insufficiency if it were considered as a patent for a quick-drying ink for ordinary printing:

(1) Considered as a patent for a hot stamping ink, the Doughty specification is probably sufficient, as the terpineol ink which it described was successful in hot stamping, and, so far as it appears, the numerous different solvents which it lists as equivalent to terpineol may be equivalent to it in a hot stamping ink.

(2) Considered as a patent for a quick-drying ink for ordinary printing, the Doughty specification is clearly insufficient. The terpineol ink which it discloses will not work on an ordinary printing press. The disclosure is thus worse than the typical insufficient disclosure which requires experimenting before it can be used;[2] for the man skilled in the art who found that Doughty's preferred terpineol ink would not work on an ordinary printing press could not be expected to start making and testing other inks with all the solvents which Doughty had said were equivalent to terpineol. There is nothing in Doughty's disclosure to lead him to select terpinyl acetate:

> "Thompson again shows a vague proposition by one who names a list of metals, among which he is to have unrestricted choice, and who points out none of the distinctions which must govern that choice in order to approximate Haynes' alloy". (*Haynes Stellite Co.* v. *Chesterfield*, 22 F. (2d) 635, 637.)

---

[1] *Goodyear Tire & Rubber Co., Inc.* v. *Ray-O-Vac Co.*, 321 U. S. 275, 276.

[2] *Dewey & Almy Chemical Co.* v. *Mimex Co., Inc.*, 124 F. (2d) 986, 989, C. C. A. 2.

Since the Doughty specification is insufficient to support a patent for a quick-drying ink to be used in ordinary printing, it cannot anticipate a patent for such an ink:

> "A description which is insufficient to support a patent can hardly be relied on as an anticipation. In each instance the same precision is required." (*Badische Anilin & Soda Fabrik* v. *Kalle*, 94 Fed. 163, 167; aff. 104 Fed. 802, C. C. A. 2).

The Hanson article (II, p. 990) published in 1931 shows how far the art was from the conception of Gessler which solved the problem of providing a quick-drying ink for ordinary printing.

The article points out in some detail the advantages which a quick-drying ink would have, and states the characteristics which the author felt were needed in such an ink.

But the article contains no solution to the problem of making such an ink. It suggested the undertaking of a complicated research to find some means for obtaining indirectly the effect of a theoretical, non-existent solvent:

> "Our problem becomes one to get the effect by indirect means. There is little obtainable information as to the sums of the partial pressures of mixtures of two or more solvents * * *. The drying result can be further effected by the kind, number and method synthesizing the combination of plastic gums present * * *. This opens up a none-too-well explored field of research. Further there are mordants and also catalytic chemicals serviceable to produce varying effects." (II, p. 990)

This vague suggestion for further research, which accomplished nothing, is clearly not a solution of the problem.[1]

The article directs the art away from Gessler's solution of the problem, which lay in selecting a solvent of the particular vapor pressure characteristics which he specified. Hanson dismissed such a solution as impossible. As to solvents, he said:

> "The solvents available have different boiling points ranging through a broad scale, but unfortunately for this problem their vapor pressure curves are nearly parallel. If we choose one from the group with a boiling point well under 250° F., the highest practical heat to apply to a printed sheet, we find that at room temperature its vapor pressure is still so great that drying will progress rapidly. On the other hand, if one is selected with a vapor pressure so low at room temperature that little drying takes place, at 200° to 250° F., we find the boiling point hardly attained or not even reached" (II, p. 990).

In other words, any solvent which you can boil off without burning the paper will evaporate fast enough at room temperature to make the ink dry on the rollers. Hanson thought that a solvent which could be boiled off the paper would solve the problem:

> "*If we could only flatten the curve* of a high boiling solvent with a vapor pressure of 1 in. of mercury

[1] The article states that some unidentified manufacturer has produced an ink "capable of drying with a very brief exposure to heat which will remain moist on inking rolls and plates for a long time" (II, p. 991). But this statement, even if it had been true (which it was not, II, pp. 1053, 1054, 1057) could not anticipate the Gessler invention:

> "The naked assertion that a certain result has been accomplished without stating how, without describing the means which produce the result is insufficient as an anticipation". (*American Graphophone Co.* v. *Leeds & Catlin Co.*, 170 Fed. 327, 331, C. C. A. 2.)

> or less at 80° down to a point where at *30 in. the boiling temperature would be reduced to only 150° or so* it would not take us long to compound an ink to meet the general characteristics for a plastic ink set forth above" (II, p. 990).

The vapor pressure curve is an inherent characteristic of a chemical. To "flatten" the vapor pressure curve of a solvent, therefore, means to change its inherent properties. One may search forever in solvent manufacturers' catalogs without finding one having a flattened vapor pressure curve. Hanson and everyone else knew this. His statement is just like saying "If we could only raise the freezing point of water, we could skate all summer". It warned the art that the desired ink could *not* be made by selecting an existing solvent.

ARGUMENT.

VALIDITY.

The recent decisions of this Court cited in petitioner's brief emphasize the importance of distinguishing between mechanical skill and invention. No court has adhered more scrupulously to its duty to apply these decisions than the Circuit Court of Appeals for the Second Circuit which sustained the Gessler patent. That court has refused "to mistake for invention the slow but inevitable progress of an industry" (*Picard* v. *United Aircraft Corporation*, 128 F. (2d) 632, 636).

The facts of the present case show the very antithesis of the normal "inevitable progress" within an industry. The patent here is based on an idea which was injected into the printing industry from the outside to solve a problem which the industry itself had long been unable to solve. This is made only too clear by the avidity with which those within the industry seized upon the new idea and used it to their advantage.

These facts bring the case directly under the rule of the cases relied on[1] by this Court in its opinion in *Goodyear* v. *Ray-O-Vac* (321 U. S. 275, 279). Under these authorities, this Court noted that invention is involved in filling a long-felt want even though

> "Viewed after the event, the means • • • adopted seem simple and such as should have been obvious to those who worked in the field". (321 U. S. 279)

---

[1] *Loom Company* v. *Higgins*, 105 U. S. 580, 589, 591; *The Barbed Wire Patent*, 143 U. S. 275, 277, 283; *Krementz* v. *S. Cottle Co.*, 148 U. S. 556; *Expanded Metal Co.* v. *Bradford*, 214 U. S. 366, 381; *Diamond Rubber Co.* v. *Consolidated Tire Co.*, 220 U. S. 428, 434-435.

Simplicity is in fact a common characteristic of many important inventions (*Carnegie* v. *Cambria*, 185 U. S. 403, 429) and affords a good guide for distinguishing the work of an inventor from that of an unimaginative man skilled in the art; for, when such a man tries to solve a problem, he resorts to a degree of complication suggesting the Goldberg cartoons. This is well illustrated in the present case by Jirousek's complicated ink formula in which he tried to combine a non-volatile solvent, a highly volatile solvent and a little wax to delay the evaporation of the volatile solvent, and by Hanson's suggestion of research in plastics to try to find some mixture that might have the properties of a non-existent hypothetical solvent with a "flattened" vapor pressure curve. Gessler's ink using a single known solvent is indeed simple in comparison with these efforts.

But petitioner's argument that it was "easy" to arrive at this simple solution of the problem is just the reverse of the fact.

Petitioner argues that it was easy for Gessler (Pet. Br., pp. 9, 10). But Dr. Gessler's complete answer on I, pp. 707-709, of which petitioner quotes only a sentence, shows that two years of work and study of the problem preceded the final solution. If the mental operations of the inventor are relevant to the question of patentability, the fact to which petitioner calls attention—that the final solution to the problem came to Gessler as a flash of thought—can hardly be urged to show lack of invention under this Court's decisions.[1]

Petitioner's contention that it would have been easy for any chemist to do what Dr. Gessler did is based on a

---

[1] *Densmore* v. *Scofield*, 102 U. S. 375, 378.
Cuno Corp. v. *Automatic Devices Corp.*, 314 U. S. 84, 91.

complete misunderstanding of the idea whose disclosure advanced the printing art.

It was *not* the idea of choosing a solvent to meet a particular volatility requirement. We concede without hesitation that when the degree of volatility or the vapor pressure characteristic required in a solvent for a particular purpose is known, "any good chemist would obtain the desired volatility by selecting the needed solvent". The Circuit Court of Appeals for the Second Circuit so stated in a decision preceding their decision sustaining the Gessler patent[1]. That the court was right in that case is fully confirmed by the proofs of the present case. The chemists of the Curtis Company's ink-maker, the chemists of the oil company called in by Mr. Cray, and the chemists of the oil company who supplied the petitioner had no difficulty in selecting a solvent for a quick-drying ink for ordinary printing—after they had learned of the success of Dr. Gessler's ink and ascertained the characteristics of its solvent.

But where did Dr. Gessler obtain vapor pressure specifications by which to select the solvent?

He certainly did not get them from Mr. Cray, the ink-maker who first asked Dr. Gessler for an odorless ink and later for an ink to be used on a press provided with a heater. Cray furnished Dr. Gessler with some information which was general knowledge in the printing art—that inks which dried on the rollers of a press were no good, and that heaters were used on printing presses. But as to information about the vapor pressure characteristics required in a quick-drying ink, it was the other way around. Cray frankly admitted that, although he had long recognized the need for

[1] *B. B. Chemical Company v. Cataract Chemical Company, Inc.*, 122 F. (2d) 526, 528.

such an ink (I, p. 97), he was never able to make one until he received Dr. Gessler's first ink, the specific illustrative ink described in the patent (I, p. 99, Re-direct).

Gessler certainly could not have obtained the required vapor pressure specifications from the old Lefferts patent which dealt with ink which would dissolve and penetrate the material on which it was printed and mentioned natural products, essential oils, of variable vapor pressure which could not serve as a criterion.

Gessler certainly could not have obtained the necessary vapor pressure specifications from the Doughty patent, for the solvent which it recommended for a hot stamping ink had a vapor pressure like those which Dr. Gessler had excluded as too volatile as a result of his work on odorless inks.

He certainly could not have obtained the vapor pressure specifications from the Jirousek patent which described an ink whose vehicle was a complicated mixture of linseed oil, light volatile oil and wax.

He certainly did not get the required vapor pressure specifications from the Hanson article, for Hanson gave very different specifications and admitted there was no solvent which had them.

What Gessler gave to the printing art was the new conception that an ink meeting the two antagonistic requirements of non-volatility on the rollers of a press and rapid evaporation on paper could be made with a single solvent having particular vapor pressure characteristics, and the discovery and disclosure of the vapor pressure criteria by which the solvent could be selected.

The ink having a solvent within the range established by those criteria is a new and patentable product under the principle recognized by this Court in *Holland Furniture Company* v. *Perkins Glue Company*, 277 U. S. 245, 255, and

again in its opinion in *Dow Chemical Co.* v. *Halliburton Oil Cementing Co.*, decided March 5, 1945.[1]

The Constitution indicates the fundamental test of patentability. Congress is authorized to grant exclusive rights for only one purpose: "to promote the progress of science and the useful arts". This Court has recently noted that what the inventor is required to give for the exclusive rights granted to him is a *disclosure.*[2] Consequently, if the disclosure does not "promote the progress of the useful arts", the patent is not within the constitutional provision. This is clearly brought out in *Atlantic Works* v. *Brady*, 107 U. S. 192, cited in the dissenting opinion in *Goodyear* v. *Ray-O-Vac*, 321 U. S. 275, 279:

> "It was never the object of those laws to grant a monopoly for every trifling device, every shadow of a shade of an idea, which would naturally and spontaneously occur to any skilled mechanic or operator in the ordinary progress of manufactures". (107 U. S. 200)

But a disclosure which advances the useful arts constitutes a valid consideration for exclusive rights under the constitutional provision:

> "The design of the patent laws is to reward those who make some substantial discovery or invention, which adds to our knowledge and makes a step in advance in the useful arts". (107 U. S. 200)

The present record establishes in an unusual way that there was no failure of consideration in the present

---

[1] This principle has been frequently applied in federal court decisions: *E. I. duPont de Nemours & Co.* v. *Glidden Co.*, 67 F. (2d) 392; *B. B. Chemical Co.* v. *Cataract Chemical Co.*, 122 F. (2d) 526, 531.

[2] *Hartford-Empire Co. et al.* v. *United States*, decided January 8, 1945.

case. Petitioner admits that there has been since 1932 a radical change in magazine printing. The record makes clear that this change was brought about by a new type of ink, and shows that the inks which have made this change possible were all derived from the disclosure which Dr. Gessler made to the printing industry in 1932. His disclosure did not await the issue of his patent. It was made at the time of his application. It was not merely a disclosure to the Patent Office, but a disclosure to the printing industry by demonstrating the operation on a high-speed press of the very ink described in the example of the application, and supplying it to others who analyzed it. The printing industry and the public have already benefited greatly by the improvement in high-speed printing which was the direct result of Dr. Gessler's original disclosure. Clearly, the disclosure is not "trifling", but one which made a valuable "step in advance in the useful arts", and so forms a valid consideration for the grant of his patent.

INFRINGEMENT.

We have shown that after Gessler disclosed his first ink to the printing industry, the ordinary skill of a chemist enabled others to duplicate it with less expensive solvents, such as narrow cuts of petroleum, and that the vapor pressures of the solvents of these inks were as low as the vapor pressure of Gessler's illustrative solvent at room temperature and were from 2 to 5 cm. at 150° C., all approximating the vapor pressure of alcohol (4 cm.) within a couple of centimeters.

After these inks based on the Gessler disclosure had proved their merits, after respondent's demonstrations had caused printers to invest in rotary presses for magazine printing and to furnish them with heaters, petitioner, re-

ceiving information from one of respondent's suppliers, duplicated one of respondent's commercial inks and sold it to respondent's customers for use on presses with heaters which had been installed for drying respondent's ink. The operation of petitioner's ink on such presses is identical with that of respondent's. Petitioner is thus obtaining the full advantage of Gessler's disclosure without having contributed anything to the making or introduction of the ink.

The basis of this Court's holding of infringement in a recent case applies literally to the facts of the present case:

> "the petitioners consciously copied the respondent's commercial cell, which was made in accordance with the claims of the patent." (*Goodyear Tire & Rubber Co., Inc.* v. *Ray-O-Vac Co.*, 321 U. S. 275, 278).

Petitioner's New Contention.

In this Court petitioner has taken a new position on infringement. Below, petitioner's only argument against infringement was a purely technical one based on misconstruing the words of the Gessler claims. Petitioner has apparently realized that a purely technical argument cannot prevail in this Court. In seeking to give substance to its technical position, petitioner has, for the first time in the history of this case, asserted that there is a practical difference between the drying of its ink and the ink of the patent.

Petitioner cannot deny that the vapor pressure of the solvent in its ink at 150° C. approximates the vapor pressure of alcohol within 2 cm.; but petitioner asserts that this difference of 2 cm. makes an important practical difference in the use of the ink.

Petitioner's contention is that, while Gessler's original ink could be dried instantly when the paper was passed around a steam drum heated to "between 100°C. and 150°C." (Brief, p. 23), the successful use of petitioner's ink "requires the heat of a flame heater" (Brief, p. 34) which is very much hotter than a steam-heated drum (Brief, p. 22).

As this contention was not made in either of the lower courts, there is nothing in any of the findings or opinions dealing with it. If this new contention is to be considered by this Court, therefore, this Court is called upon to act as a jury to determine from the record whether or not petitioner's new contention is true. Respondent's position is that petitioner's last-minute contention is a fiction advanced by petitioner to meet the exigencies of this case and is unworthy of consideration by this Court. As this question of fact is new, we shall deal with it in some detail:

The basis for petitioner's new contention is a confusion of two very different things: (a) the temperature to which something is heated, and (b) the means by which it is heated to this temperature.

a. Temperature

The vapor pressure and rate of evaporation of a liquid depend upon the temperature of the liquid and not at all upon the method or means used to bring the liquid to this temperature. The problem of making a quick-drying ink, which the Gessler patent solved, involved the matter of temperature.

It would have been easy—and useless—to make an ink which could be dried instantly by burning up the paper on which it was printed. Gessler's invention provided an ink capable of instantaneous drying at a temperature as

low as 150°C. which would not char the paper. This fact was clearly brought out in the three passages from the file-wrapper (II, pp. 790, 840, 890) quoted on page 23 of petitioner's brief. Petitioner has omitted the part of the sentence on II, p. 840, which stated that the temperature of McElroy's die—500°F. or 260°C., far above the temperature of 150°C. mentioned in the Gessler patent—"would burn the paper on which the print was made". (II, p. 840)

b. Means for Heating

After Gessler had created an ink which dried instantly at a temperature to which paper may safely be heated, the question of how the paper shall be raised to this temperature in the use of the ink was a purely mechanical one. The heaters which are used commercially for this purpose include the following:

(1) A heated drum or roller around or against which the web of paper is drawn. The heat is transferred from the hot metal roller to the paper in contact with it rapidly so as to bring the paper up to substantially the same temperature as the roller. This type of heater had long been used in rotogravure presses. It has been used at the Curtis Publishing Company's plant both for inks made with Gessler's original illustrative solvent and with those made from the cheaper petroleum solvent (I, pp. 79, 80, 82, 88).

(2) A blast of hot air heated to the temperature to which the paper is to be raised is blown against a long section of the paper web. This heating means was also familiar in rotogravure presses. It is used on typographic presses in two commercial plants to heat inks of the Gessler type made with petroleum solvents (I, pp. 158, 617)[1].

[1] The references to hot air heating on these pages are referred to in petitioner's brief on page 17 as uses of flame heaters.

(3) The flame of a pressure gas burner directed upon or close to a short section of the paper web. In this case, the heat is transferred to the ink and paper, not from hot metal, but from hot gas. In order to raise the temperature of the ink and paper during the fraction of the second while it is passing by the gas burner,[1] it is necessary to have the gas at a temperature far above the temperature to which the paper is to be raised. Thus, such heaters are operated at temperatures of from 1200° to 1500° F. to heat the paper to 275° F. which is 135° C (I, pp. 68, 70, 92). Such a heater is described in the Brunell patent applied for in 1924 which shows the mechanical arrangements necessary to turn off the gas when the paper stops or slows down in order not to burn the paper.[2] Heaters of this sort are used in several, but not all,[3] large magazine plants for drying the inks based on the Gessler disclosure.

(4) A hot drum and a gas flame have been used in combination to dry inks of the Gessler type containing the original illustrative solvent (I, p. 187, Q 15; p. 206, XQ 41).

(5) Combinations of the various types are not uncommon in commercial installations:

> "We do not use gas in all heating cases. We resort to the use of steel steam drums and also to the use of plain hot air in some cases, and we also use in these extra fast presses a combination of a hot oil drum, a ribbon burner and hot air in addition to that. All three types are used on some of the presses today". (I. p. 94)

All the commercial heaters are necessarily so used as to avoid heating the paper to a temperature which would

---

[1] I, p. 70.

[2] *Ante*, p. 6.

[3] The Curtis Company, one of the largest users of ink in the country (I, p. 102), has used a steam-heated drum.

scorch it. In gas heaters, the gas must be regulated in accordance with the speed of the paper in order to avoid scorching. This was so obvious to the District Court that it was not elaborated in the testimony (I, pp. 93, 94, 530). An economical printer uses no more gas than he finds necessary to dry the ink (I, p. 156). The testimony indicates that the usual temperature of the paper in the various heaters is about 275° F., which is 135° C. (I, pp. 70, 205, 617).

Selection among the various types of heaters available is made on the basis of the amount of space and time available for heating the paper up to the drying temperature of the ink (I, pp. 98, 99). It does not depend upon which of the various commercial inks based on the Gessler disclosure is to be used. The commercial inks have solvents whose vapor pressures at 150° C. are within the range of from 2 cm. to 6 cm. This is true both of the inks manufactured by respondent under the patent and the inks which have been sold by the Curtis ink-maker who first imitated the original Gessler ink.[1] There is no evidence in the record that this slight variation has had any effect on the choice of the heaters used to dry the inks.

Kerley's Testimony

The only thing in the record which gives any shadow of support to petitioner's contention that flame heaters are necessary to dry petitioner's ink is found in the testimony of petitioner's witness Kerley, repeatedly cited in its brief:

> "Q. Do you know whether or not the advent of a good oven had anything to do with the success of heat-set inks? A. I would say without an oven you could not run any of them. * * *

[1] I, pp. 126, 640-41.

"Q. And it wasn't until later that you got a successful heater? A. That is right, high pressure type.

"Q. And that, you think, has largely to do with the success of these inks? A. Yes, I think so" (I, p. 551, cited Pet. Br., pp. 17, 21, 22).

Before these vague expressions of opinion can be given any probative value, the reliability and knowledge of the witness must be considered:

Kerley failed in the printing ink business (I, p. 562), then worked as a salesman for others, tried unsuccessfully to develop a heater for drying linseed oil (I, p. 565), and then went to the Hall Printing Company in 1937 (I, p. 561). In his direct testimony, he said that neither respondent's nor petitioner's ink was satisfactory, and that the only good heat-set ink was one which he made himself (I, pp. 548, 550, 546, 550). At the time to which he referred, respondent's ink had already been in successful commercial use in printing "Life" for several years.[1] On cross-examination, the witness admitted reluctantly that the Hall Publishing Company had used respondent's ink before the witness had made any ink (I, p. 564), and he could not deny that it was on the strength of this that they had invested in heaters before the witness came with them (I, pp. 571-572). He admitted also that what he had referred to in direct testimony as "making" a heat-set ink consisted merely in pigmenting and adjusting the base of such an ink which he had purchased with the solvent in it (I, pp. 565-566).[2] He refused to disclose the source from which he had purchased the unpigmented ink (I, pp. 565-568).

[1] Testifying in 1943, the witness said that it was only within the last two years, that is after 1941, that respondent had made satisfactory inks. Respondent's inks have been used in printing "Life" since 1936 (I, pp. 588-589).

[2] See I, p. 219.

He admitted that he had had no acquaintance with heat-set inks before 1937 (I, p. 563).

Kerley did not claim to have any accurate knowledge as to the temperature of heaters:

> "Q. How hot are they? A. Well, we have measured to a degree as possible; they go from the tip of the flame, from 1700 to 1900 degrees of heat, but on the traveling web I would say they don't take over 350 to 400 [177° C.-204° C.] degrees of heat" (I, p. 550, cited Pet. Br., pp. 17, 23).

It is apparent from this answer that the witness was merely guessing at the heat of the paper. He did not attempt to state the temperature to which the paper had to be heated in order to dry the ink or the temperature to which the paper could be heated without scorching.

We submit that this witness' opinion as to what sort of heater is required for any particular heat-set ink is no more valuable than his opinion that respondent's highly successful heat-set ink is unsatisfactory.

Furthermore, his opinions do not purport to show the peculiar heater requirements of petitioner's ink or of any other ink whose solvent had a vapor pressure at 150° C. of precisely 2 cm. He lumped together petitioner's ink (2 cm. at 150° C.) and respondent's ink (2-5 cm. at 150° C.) and said there was no difference between them (I, pp. 546, 547, 550).

A complete answer to petitioner's contention that its ink required a special heater or an usual degree of heat is found in the proofs as to the use of respondent's ink by the Crowell-Collier Publishing Company, printers of *Collier's* and other magazines. The manager of this company testified that his company was using both respondent's and petitioner's quick-drying inks, and that there was no

difference in their action on the press or in drying (I, p. 238, first two Qs). He also said that inks of this type were dried *either by contact with a steam drum or by passing through a gas oven* (I, p. 237). When cross-examined as to the heat of the gas oven used on his presses, he said:

> "Q. How hot do those ovens get, about? A. Well, of course it depends entirely on the speed of the press. I am quite sure it is around 1400 degrees.
>
> Q. Fahrenheit? A. Fahrenheit, yes. *We don't use that much heat but some people do. We use about 950 degrees I think.*" (I, p. 505).

Here is direct proof by an impartial witness that petitioner's ink is being dried commercially in an oven operated at a temperature much lower than that usually used for drying respondent's inks.

We submit that there is no basis whatever for a fact finding that petitioner's ink *required* any different type of heater from the original Gessler ink and all the other inks based on the Gessler disclosure. No such finding was made by either court below, and there is nothing in the record to support such a finding by this Court.

Petitioner's contention that there is a practical or observable difference between its ink and the original Gessler ink should be disregarded as contrary to the proofs. The record makes it entirely clear that the petitioner is a late-comer who has selected the solvent of its ink so as to obtain the full benefit of Gessler's disclosure.

Petitioner's Technical Argument.

There remains only the technical argument which petitioner presented below. It involves the words of the claims and the filewrapper:

Petitioner first tries to construe the claim without reference to the invention which is described in the specification (Pet. Br., p. 3), and rewrites the claim to divorce it from the invention so as to be able to argue in the abstract that 20 cannot approximate 40 (Pet. Br., pp. 4, 5). Petitioner is disregarding the famous words of Justice Holmes:

> "A word is not a crystal, transparent and unchanged, it is the skin of a living thought and may vary greatly in color and content according to the circumstances and the time in which it is used.[1]

And this is still more true of figures which convey nothing when they are separated from the connection in which they are used.

Thus, the question is not whether 20 approximates 40 or whether 2 approximates 4 in the abstract. It is whether the vapor pressure of a highly volatile liquid approximates the vapor pressure of a typical highly volatile liquid when both evaporate at substantially the same rapid rate. Considered from this realistic point of view, it is evident that the vapor pressure of petitioner's solvent at 150° C., which is equal to the vapor pressure of the volatile liquid toluol, approximates the vapor pressure of the typical volatile liquid alcohol.

The filewrapper fortifies this conclusion. The claims first presented show that Dr. Gessler recognized that the *precise* value of the vapor pressure at elevated temperature was not a *sine qua non* of the use of his invention. The filewrapper shows that Dr. Gessler had this idea from the time he filed his application, not merely at a later date when he located a second solvent suitable for use in his ink.

The difficulty with the rejected claims was that they were functional and broad enough to include a solvent which

---

[1] *Towne* v. *Eisner*, 245 U. S. 418, 425.

was raised to its boiling point in order to evaporate it.[1] The claims were amended to limit them definitely to the actual disclosure in the specification—the instantaneous drying of the illustrative ink by heating it "to about 100° C. or above" where the solvent was far below its boiling point[2] and had a vapor pressure like that of the volatile liquids of which alcohol is typical.

The filewrapper clearly shows that both applicant and the examiner understood the expression "approximates the vapor pressure of ethyl alcohol" to allow a leeway of a couple of centimeters. This is pointed out in the opinion of the Circuit Court of Appeals:

> "That the word 'approximates' gives leeway of at least 2 cm., is plain, since the vapor pressure of the solvent especially recommended in the specification was 6 cm., at 150° C., that is to say, 2 cm. greater than the pressure of ethyl alcohol at ordinary temperature" (II, p. 1103).

Petitioner objects that the leeway was intended to be only in one direction, namely, in the direction which would exclude petitioner's solvent. This objection is met by the specification and the filewrapper which show that the vapor pressures which applicant regarded as too low to approximate that of alcohol were all below one centimeter:

In the third passage from the filewrapper which petitioner's brief quotes on page 23, applicant said that his ink could not be made with a solvent having

> "a comparatively low vapor pressure at 150° C., as in this case it could not be vaporized instantly by any heat which can safely be applied to printing matter" (II, p. 891).

---

[1] Such as Hanson's hypothetical solvent with a "flattened" vapor pressure curve (See *ante*, pp. 33-34).

[2] The boiling point of the illustrative solvent is 225°–230° C.

The meaning of "a comparatively low vapor pressure at 150° C." in this statement is shown by parts of the statement which petitioner does not quote. The statement distinguishes prior patents from the claims on the ground that the vapor pressures of their solvents are too low at 150° C. These patents describe inks having solvents with vapor pressures below one centimeter at 150° C. (II, p. 893 2nd and 4th pars.). This confirms the conclusion which the Circuit Court of Appeals drew from the specification:

> "The degree of difference that was regarded as precluding an approximation is illustrated by the solvent dibutyl phthalate mentioned at page 2, line 9, of the Patent as being a pressure of only .14 cm. at 150° C. and evaporating slowly" (II, p. 1103).

The leeway is clearly intended to extend a couple of centimeters in both directions. "Approximates" does not mean "as great as."

And even if petitioner's construction of the claim were possible, it cannot be adopted under this Court's decisions:

> "* * * there being nothing shown in the state of the art which requires any such construction of the second claim as that contended for by the defendant, and it being fairly susceptible of the opposite construction, and the latter being one which is commensurate with the real invention embraced in the second claim, and one which prevents the real substance of that invention from being bodily appropriated by an infringer, it is proper to give the claim such a construction." (*Lake Shore &c., R. Co.* v. *Car-Brake Shoe Co.*, 110 U. S. 229, 236).
>
> "If the matter were doubtful, it is plain from what has been said that the character of the patent and its commercial and practical success are such as to entitle the inventor to broad claims and to a liberal construction of those which he has made. *Moreley*

Machine Co. v. *Lancaster,* 129 U. S. 263, 273-277; *Eibel Co.* v. *Paper Co.,* 261 U. S. 45, 63; *Winans* v. *Denmead, supra,* 341. In such circumstances, if the claim were fairly susceptible of two constructions, that should be adopted which will secure to the patentee his actual invention, rather than to adopt a construction fatal to the grant, *Keystone Manufacturing Co.* v. *Adams,* 151 U. S. 139, 144, 145; *McClain* v. *Ortmayer,* 141 U. S. 419, 425." (*Smith* v. *Snow,* 294 U. S. 1, 14).

We submit that the Circuit Court of Appeals was correct in holding that petitioner's ink is as clearly within the intended meaning of the words of the claims of the Gessler patent as it is within the scope of the invention which Gessler made.

CONCLUSION.

The Opinion of the Circuit Court of Appeals shows that the court found the brief findings of the District Court altogether inadequate to present the facts bearing on validity and infringement and clearly erroneous as to the prior patents. Mindful of its obligation under the Rules, the Appellate Court reached this conclusion only after a thorough study of the record which enabled the Appellate Court to make the first adequate statement of the facts in the case. These facts clearly set forth in its opinion can lead only to the conclusion that the patent is valid and infringed.

The decision of the Circuit Court of Appeals should be affirmed.

Respectfully submitted,

ROBERT W. BYERLY,
RALPH M. WATSON,
Counsel for Respondent.

SUPREME COURT OF THE UNITED STATES.

No. 656.—October Term, 1944.

Sinclair & Carroll Company, Inc., Petitioner, *vs.* Interchemical Corporation.	On Writ of Certiorari to the United States Circuit Court of Appeals for the Second Circuit.

[May 21, 1945.]

Mr. Justice Jackson delivered the opinion of the Court.

This infringement suit was brought by the assignees of a patent on a printing ink. Respondent, Interchemical Corporation, asserts that inks made by the petitioner infringe on claims 3, 10, 11, 12 and 13 of U. S. Patent No. 2,087,190 which was issued to Albert E. Gessler on July 13, 1937. Claim 3, which is typical, is as follows: "A printing ink which is substantially non-drying at ordinary temperatures and dries instantly on heating of the printed matter, consisting of coloring matter dispersed in an organic viscous vehicle consisting of a liquid component and a solid component completely dissolved in the liquid component in sufficient quantity to give the ink the consistency of an ordinary oil-varnish printing ink—the solid component being a member of the group consisting of natural and synthetic resins and cellulose compounds, substantially all of the liquid component having a vapor pressure at 20° C. as low as that of diethylene glycol monobutyl ether at 20° C., and the major part of the liquid component having vapor pressure which at 150°C. approximates that of ethyl alcohol at ordinary temperatures and forming a stable solution with the solid component.". In other words, Gessler claims to have invented an ink which will not dry at room temperature but which will dry instantly upon the application of heat after printing. Such an ink is of no particular value in the printing of newspapers or other publications which use absorbent paper. This can be done acceptably with ordinary inks containing linseed oil which is non-volatile at all relevant temperatures. The paper absorbs the ink when one side is printed, and the other side can be printed immediately without danger of smudging.

But the ink disclosed in the patent does have utility in the printing of magazines and other materials which use smooth non-

absorbent paper. Since its disclosure by Gessler, it or similar inks which are claimed to infringe, have been used to print "The New Yorker", "Collier's", and "The Saturday Evening Post." Such publications previously would require considerably more time for printing since the reverse side of the paper which they used could not be printed until the first side was dry. Nor could the sheets be stacked or folded without danger of "offset" printing. The smooth paper would not absorb the linseed-oil inks, and delay of from one to twenty-four hours was necessary before printing was sufficiently dry to allow the sheets to be worked upon again.

Many efforts were made to eliminate the necessity for delay. The problem was complicated by the fact that the presses used in this kind of printing are equipped with a long series of ink-distributing rollers to spread out the ink to the optimum thin film before it is applied to the type. Hence, when inks with volatile components were used, they would dry on the rollers before they got to the type. And if inks with non-volatile ingredients—like linseed oil—were used, they would not dry except by slow oxidation. Other approaches to the solution of the problem included the exposure of sheets printed from linseed-oil inks to ozone, but that process was dangerous and not wholly satisfactory. Gessler's ink combines the qualities of an ink which does not dry on the rollers and one which dries quickly after printing when heat is applied to it.

These characteristics of the ink result from the nature of the solvent which is one of its components. Gessler, in his specification, named butyl carbitol (diethylene glycol monobutyl ether is said to be the more accurate scientific term) but that compound was given only as an example, and most of the inks which his company now makes contain "narrow cuts" of petroleum in place of butyl carbitol. A narrow cut of petroleum consists of only a few kinds of hydrocarbons, and consequently evaporates consistently since each of the hydrocarbons has substantially the same vapor pressure curve. The allegedly infringing inks similarly are made with narrow cuts of petroleum. All of these solvents have the peculiar quality of being relatively non-volatile at ordinary room temperature but highly volatile at a temperature of 150°C., a temperature to which paper can safely be heated without burning. There is no question that inks containing these solvents have enabled magazines to be printed on high-speed rotary

presses which are furnished with heating devices, without interruption for drying.

The District Court held Gessler's patent invalid because anticipated by the prior art, and held that the petitioner's inks did not infringe. *Interchemical Corporation* v. *Sinclair & Carroll Co.*, 50 F. Supp. 881. The Circuit Court reversed, holding the patent valid and infringed. *Interchemical Corporation* v. *Sinclair & Carroll Co.*, 144 F. 2d 842. We granted certiorari. — U. S. —.

There has been a tendency among the lower federal courts in infringement suits to dispose of them where possible on the ground of non-infringement without going into the question of validity of the patent. *Irvin* v. *Buick Motor Co.*, 88 F. 2d 947, 951; *Aero Spark Plub Co.* v. *B. G. Corp.*, 130 F. 2d 290; *Franklin* v. *Masonite Corp.*, 132 F. 2d 800. It has come to be recognized, however, that of the two questions, validity has the greater public importance, *Cover* v. *Schwartz*, 133 F. 2d 541, and the District Court in this case followed what will usually be the better practice by inquiring fully into the validity of this patent.

A long line of cases has held it to be an essential requirement for the validity of a patent that the subject-matter display "invention", "more ingenuity . . . than the work of a mechanic skilled in the art." *Hicks* v. *Kelsey*, 18 Wall. 670; *Slawson* v. *Grand Street R. Co.*, 107 U. S. 649; *Phillips* v. *Detroit*, 111 U. S. 604; *Morris* v. *McMillin*, 112 U. S. 244; *Saranac Automatic Machine Corp.* v. *Wirebounds Patents Co.*, 282 U. S. 704; *Honolulu Oil Corp.* v. *Halliburton*, 306 U. S. 550; *Cuno Engineering Corp.* v. *Automatic Devices Corp.*, 314 U. S. 84, 90. This test is often difficult to apply; but its purpose is clear. Under this test, some substantial innovation is necessary, an innovation for which society is truly indebted to the efforts of the patentee. Whether or not those efforts are of a special kind does not concern us. The primary purpose of our patent system is not reward of the individual but the advancement of the arts and sciences.[1] Its in-

[1] See the testimony of Commissioner Coe before the TNEC: "It is not the principal purpose of the patent laws of our country or of any nation to reward an individual. The purpose is much deeper and the effect much wider than individual gain. It is the promotion of science and the advancement of the arts looking to the general welfare of the Nation that the patent laws hope to accomplish. The individual reward is only the lure to bring about this much broader objective. Every patent granted benefits society by adding to the sum total of human knowledge, but that is not enough, and that alone will not achieve the ultimate goal of the patent system." TNEC Hearings, Part 3, p. 857.

ducement is directed to disclosure of advances in knowledge which will be beneficial to society; it is not a certificate of merit, but an incentive to disclosure. See *Hartford Empire Co.* v. *United States,* decided Jan. 8, 1945, p. 33. Consequently it is not concerned with the quality of the inventor's mind, but with the quality of his product.

The patent in suit was not the product of long and difficult experimentation. Although like other patent cases, this has an extensive record, it is hard to see wherein Gessler's invention consists. In 1930, he was asked to make an odorless ink, and he selected from a catalog of a chemical manufacturer three solvents which the catalog indicated to be relatively odorless. Their vapor pressures, that is, their rates of evaporation at various temperatures, were also listed. He tried inks made with each of the compounds as a solvent and decided that butyl carbitol was the most satisfactory, since it did not dry while on the rollers, at ordinary temperature.

The company which had requested the odorless ink, however, found that it was unsatisfactory for other reasons and, after some further effort, Gessler stopped trying to solve that problem. Sometime in 1932, however, the same company asked Gessler whether he could supply them with an ink "that would be dry after being printed? We can put it over some kind of heating device." Gessler's answer was, "Yes, I think we could. In fact, one of those inks I made for you in the beginning would do that." Gessler testified as follows: "And now, when Mr. Cray came, in the year 1932, and told me that heating units, steam-heated rollers are used on printing presses, that was the last key that I needed for the solution of the problem. I had not known that before, and I knew that if I could apply any heat to the thin film of those inks that they would dry almost instantaneously. With that in mind that was the mental background, I would say, that I sent this particular ink to Mr. Cray. I did not send him a number of inks or a selection of inks, but I sent him just one specific ink." And with respect to the solvents he had chosen, Gessler testified further:

> Q. What I want to get straight in my mind, Dr. Gessler, is this: You selected these three, is that right? A. That is right.
>
> Q. Did you select them from a much longer list? A. That is right.
>
> Q. And before you selected them you tried them all out, did you? A. No. You see the list is listed according to the

boiling point, and if you followed on I took it from a certain boiling point on upwards.

Q. Oh, I see. You took them out of a long list in accordance with their boling point? A. That is correct. That was my first indication of evaporation rate.

. . . . . .

Q. . . . In selecting these three solvents that you referred to, butyl cellosolve, carbitol and butyl carbitol, did you have reference to a Carbide & Carbon Chemicals Corporation catalog? A. I knew them. I don't know if I had reference, but I knew naturally those solvents.

Q. You may have referred to a catalog? A. I may have, certainly. I most probably had the catalog.

Q. You got copies of their catalogs, did you? A. Oh, yes.

. . . . . .

Q. On the fly-leaf of the Carbide & Carbon catalog there is a list of their products. Do you remember that list (handing to witness)? A. A similar list.

Q. That gives boiling points and vapor pressures? A. It does.

Q. And you may have selected these three solvents that we are talking about from that list? A. That is possible, although I knew the solvents. I was very conversant with them. I told you a while ago why.

Butyl carbitol was first put on the market in 1929, and subsequently was listed in the catalogs of Carbide & Carbon Chemicals Corporation. It cannot be said that Gessler's contribution was a recognition that a solvent having the peculiar qualities of negligible vapor pressure at room temperature and high vapor pressure at 150°C was what was needed. Both the circuit court and the district court found that an article written in 1931, referred to as the Hanson article, had posed the problem.[2] It is difficult to believe that if Hanson had known of the qualities of butyl carbitol, if he had had the Carbide & Carbon catalog before

[2] The relevant part of the Hanson article, which appears in the record, is as follows: "The solvents available have different boiling points ranging through a broad scale, but unfortunately for this problem their vapor pressure curves are nearly parallel. If we choose one from the group with a boiling point well under 250° F. [121° C.], the highest practical heat to apply to a printed sheet, we find that at room temperature its vapor pressure is still so great that drying will progress rapidly. On the other hand, if one is selected with a vapor pressure so low at room temperature that little drying takes place, at 200° to 250° F., we find the boiling point hardly attained or not even reached.

"If we could only flatten the curve of a high boiling solvent with a vapor pressure of 1 in. of mercury or less at 80° down to a point where at 30 in. the boiling temperature would be reduced to only 150° or so it would not take us long to compound an ink to meet the general characteristics for a plastic ink set forth above."

him, he or any other person skilled in the art could not have devised the ink which Gessler claims to have invented. We reach this conclusion even though Hanson testified in an affidavit introduced in support of a motion for rehearing that he had worked for over a year trying to produce such an ink and did not succeed.

The District Court based its judgment on anticipation by prior patents. Most of these pertained to inks which were not used in ordinary printing: Lefferts and Stevens, No. 380,654, issued April 3, 1888, was an ink used for printing on celluloid and other pyroxyline compounds; the Doughty and McElroy patents, Nos. 1,439,696 and 1,450,692, issued December 26, 1922 and April 3, 1923 taught an ink which was mainly useful for stamping with metallic inks by means of heated dies. But the Jirousek patent, No. 1,954,627, issued April 10, 1934 was for an ordinary printing ink. Jirousek's patent was directed to "a composition . . . which can set quickly and dry rapidly and also handle and feed properly and distribute freely." And the patent specifies, "In the use of such compositions, immediately after the impression is made, heat should be applied, and most advantageously this may be accomplished by a suitable heater, electric, gas, etc., arranged on or adjacent the press, so that the delivered printed impression is subjected to a substantial degree of heat to complete the setting action."

The inks disclosed in these prior patents did not contain the same solvent or solvents similar to those which Gessler recommended and which his company and the petitioners now use. They had different vapor pressures both at room temperature and at 150° C. But all these patents taught an ink made with a solvent that would be non-volatile at room temperature and highly volatile when heated. Gessler's solvent is undoubtedly more satisfactory than any of the solvents mentioned in these patents, but it must be remembered that all but one of these patents were granted before butyl carbitol appeared on the market. The fact is that Gessler himself to a large extent has abandoned butyl carbitol and now uses a narrow cut of petroleum. Even assuming that if Gessler had discovered the compound he would be entitled to a patent, he did not discover it. Reading a list and selecting a known compound to meet known requirements is no more ingenious than selecting the last piece to put into the last opening in a jig-saw puzzle. It is not invention. The judgment below is reversed.

Mr. Justice BLACK and Mr. Justice DOUGLAS concur in the result.